PRODUCTS finishing

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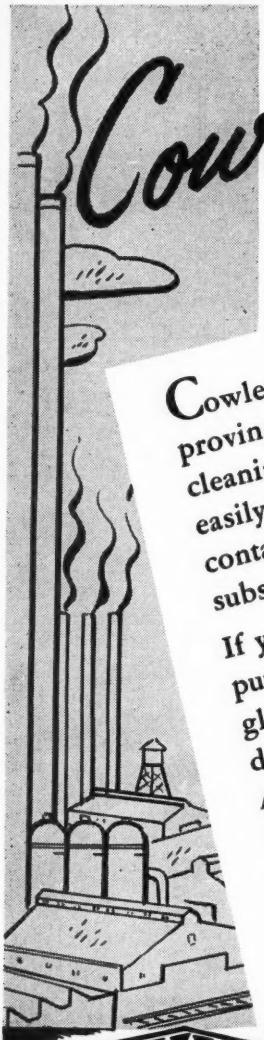

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Products Finishing

WITH the manufacturing plants and departments embarking on a program of increased production in order to meet the urgent needs of the rearmament program, it is evident that the finishing department will be forced of necessity to increase their production also. And in view of the fact that the demand for such an increase may last only for as long as the need for war munitions lasts, it is obviously good sense to achieve that production increase through the use of better equipment rather than plant extension.

To aid finishing department executives in their search for methods and equipment which will enable them to meet the demand for increased production, Products Finishing presents this month a brief summary of important developments of the past year under the heading "The 1940 Finishing Review."

Here may be found descriptions of the plating processes that have been placed on the market, the organic and inorganic finishing materials that have been developed, and the methods of finishing material application that have been tested and approved during the past twelve months. One factor remains responsible for these developments—unfettered research. It is of utmost importance, too, that the channels of research through which these developments have emerged be kept open.

Research is the life-blood of progress in any branch of science or industry—including the finishing of metals. Research has been responsible for the marvelous developments of the past few years—color plating, electro-polishing, polymerization of finishing materials—and research will continue to point the way to better methods and finer ultimate results in the finishing field.

JANUARY, 1941 **Vol. 5, No. 4**

Fig. 1—View of Beech Grove finishing shop

Railroad Adopts Modern Fin

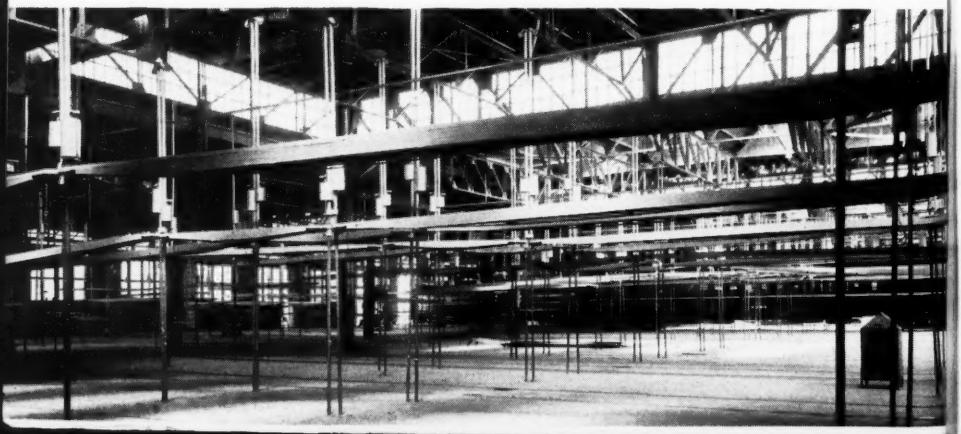
New high standard of workmanship obtained with up-to-date painting methods and equipment in railroad car maintenance shop

By CARLETON CLEVELAND

TO reduce surface deterioration and counteract the ravages of rust and corrosion, and to maintain the rolling stock in attractive appearance, the Big Four shops at Beech Grove, Indiana, southeast of Indianapolis, being one of the car repair points on the New York Central System, has a passenger car paint shop that is one of the largest and most modern railway shops for this purpose in the country.

The paint shop, as shown in Fig. 1, is located in a separate fire-proof building and has a floor space of 75,000 sq. ft. Large window areas and skylights in the roof, provide maximum daylight illumination, thus artificial lighting is reduced to a minimum. The space occupied by this de-

Fig. 2—Interior view of finishing shop showing the arrangement of adjustable scaffolds which enable workers to move conveniently around the car being finished.



partment is divided into three departments—a general shop department for work on cars prior to the spray painting of various finishing materials accommodating 32 cars at one time; a department for spray painting, accommodating four cars at one time; and a paint and varnish department where all small and miscellaneous parts are painted.

For easy access of all parts of the car in order to perform the preparatory work for refinishing, the shop is equipped with adjustable scaffolds at each track. These may be adjusted to any height so that the worker has no trouble in reaching all parts of the car. These scaffolds are so constructed that they insure a maximum amount of safety for the workmen.

As cars are brought into the shop, an interior view of which is shown in Fig. 2, for general repairs, they are inspected and classified as to their present paint condition. In other words, it is determined whether or not the car can be repainted over the old paint film, or if the old paint film must be removed.

After being stripped of all removable parts, the cars are sent to the Fabricating Department for any needed repairs, and then to the adjacent Scrub Department, where they receive a thorough scrubbing. After this operation the cars are sent to the paint and varnish department for refinishing.

While the cars undergo repairs in the car repair shop, all new steel repair work and also unexposed portions are painted with a rust inhibitive paint which reduces the rusting of concealed parts of the cars to a minimum. After all repairs have been made, the under frames are cleaned of all loose scale and road film and then sprayed with a cement consisting of asphalt, oils, and fibre. This work is done outside the shop.

By now the cars are ready to be

Finishing Methods

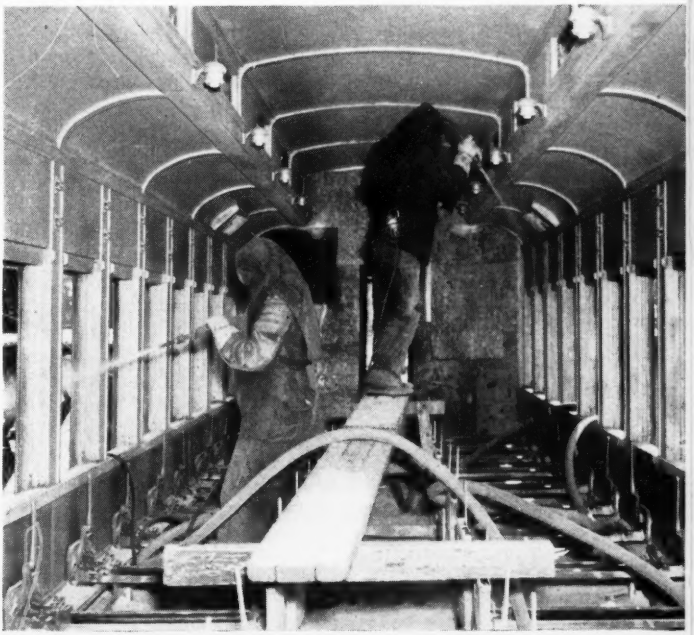


Fig. 3 — The interior surfaces of the coaches are sandblasted by the workmen shown in this illustration.

Fig. 4—A general view of location where both car interiors and exteriors are sandblasted.

taken to the paint shop where they are scrubbed, interior and exterior, prior to puttying, glazing, and sanding. If scrubbing is not necessary and the old paint film is to be removed from the exterior of the cars, they are set in the paint shop on the paint stripping position instead of on the scrub position. In this position, paint is removed from the exterior of cars down to the bare steel. This is done by the use of a hot stripping method—the equipment consisting of a 50-gallon tank for holding the solution. This solution (8 oz. stripper material to one gallon of water) is kept at a temperature of 180 degrees F. by a series of steam coils in the tank. Below the tank are two centrifugal pumps—one a suction pump and the other a feed pump.

The stripping solution is pumped through a rubber hose to and through a rake tube which rests against the side of the car just below the roof eave. The solution passes through the rake at a rate of 30 gallons per minute, and flows over the old paint film on the side of the car until all paint is completely removed. The time required for complete removal of paint from a section of approximately 72 sq. ft. ranges from six to 15 minutes, depending on the condition of the old paint film and the number of times the car has been repainted without previous removal of paint.

The stripper flows down the side of the car and is carried by gravity through a series of troughs at the bottom of the car to a sump tank at the end of the car, from which point it is pumped back to its starting point in the large stripping tank and again heated to 180 degrees F. and reused.

After this, the cars are thoroughly rinsed and steamed so that all of the stripping solution is removed, and then are allowed to dry. Following this operation, they are taken to the spray room and primed. The stripper method adopted for the removal of paint and preparing the surface for repainting, has been found to be economical and at the same time does a very thorough job. Interiors, however, if paint is to be removed, are subjected to the sandblasting method as shown in Fig. 3. A view of the location to which the cars are taken for the sandblasting operation is shown in Fig. 4. Operators doing this work wear the latest approved safety abrasive masks. The sand is cleaned from the cars, screened, and used again until the abrasive no longer has the satisfactory cutting qualities. Workmen, while performing sanding operations or working around sand-

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blast position, wear approved dust respirators. It is only after the cars are thoroughly cleaned that they are puttied and glazed where necessary. After a sufficient drying time, the putty and glaze is sanded, after

To safeguard the health of the workers a curtain of air is provided between the spray operators and the surface of the cars being sprayed. All spray vapor is picked up on the rebound and carried up through the

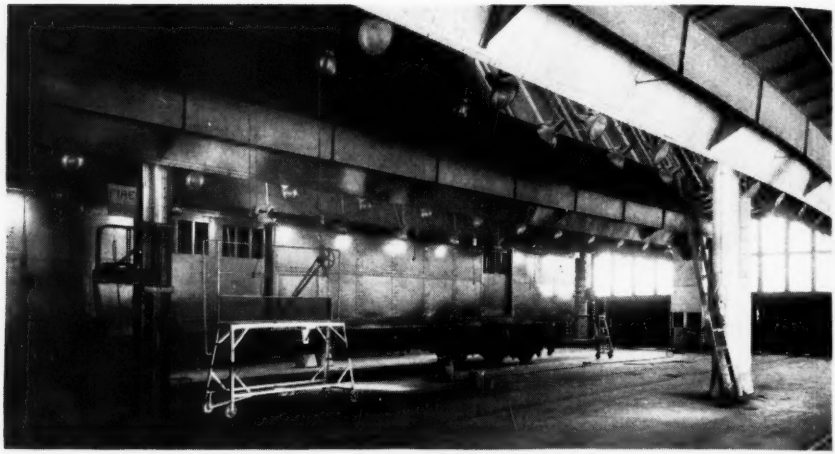

Fig. 5—An interior view of the paint spray department showing canopy ventilating hoods and lighting arrangement.

which the cars are ready for the paint spray department.

In the spray department, a view of which is shown in Fig. 5, the surface of cars is thoroughly dusted and tacked. Thereupon it is sprayed with a surfacer over the primer, and over the putty and glaze. After this material has dried, the finish colors are sprayed on. It is possible to handle four cars at a time in the paint spraying department. Over each track is a 90-foot spray canopy exhaust system. These canopies are the latest and most modern arrangement whereby refinishing of large objects by spray can be done under ideal conditions for the workmen and the work itself. They insure elimination of risk to health and reduce the fire hazard.

overhead canopy.

The interiors of cars is sprayed under the same canopies, all spray vapor being carried out of the window openings of the car and up through the exhaust system. When spraying cars whose windows are sealed in and cannot be removed, a special interior paint blower is used, exhausting paint vapor at end of the car and up through the canopies.

After completion of the work on the car in the spray department, it is set back in the paint shop where the roof is cemented, using the same type of cement that is used on the under frame of the cars. Cars are lettered, then stenciled and touched up after they have been trimmed. This completes the finishing process

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Fig. 6—The spray operators use portable scaffolds such as the one shown herewith. This view shows the hand operated power mechanism and also the steering lever employed on the scaffold.

and the cars are now ready to be put into service again at the various points on the New York Central System.

All workmen doing the spraying in the paint shop are also provided with respirators, except those doing the painting of the interior of cars. For this, a hood type respirator is worn. This is not the usual cotton pad filter type, but one that fits completely over the head and has only one opening in front—for the eyes. The wearer breathes air that is filtered and enters at back of the respirator. This air escapes through the front of the respirator, forcing the paint vapor away from the face. All equipment used for spraying operations at the Beech Grove Passenger Paint Shop is the most modern obtainable. All paint operations at this shop are done on piece work basis, and are inspected by piece work inspectors after each operation. Portable scaffolds, as shown in Fig. 6, are used also in the paint spray department. These are made as light as possible and yet built to insure safety for the workmen. They are operated and moved around cars from the top of the scaffold by turning a wheel which is geared to a wheel at the bottom of the scaffold by a chain belt, and are guided by a steering lever at the top of the scaffold.

The paint mixing department is located in one section of the paint and varnish department. All paints are mixed in this room to the proper consistency for the particular purpose for which they are to be used. All spray materials are mixed as they are to be used and delivered to the spray department as each color is needed. This eliminates, to a certain extent, any separation of pigment and vehicle and prevents settling in bottom of tank. Lacquers are used for all exterior painting, and synthetic enamels for all interior colors.

The paint and varnish department is available for refinishing all interior fittings, fixtures, and hardware for the cars. A view of a spray booth in this department is shown in Fig. 7. This department has three spray booths for doing this work. All window sash of the removable type is also finished in this department, the sash being puttied and glazed before they are sanded and sprayed. These sash are removed and stored in portable wagons, each wagon holding a

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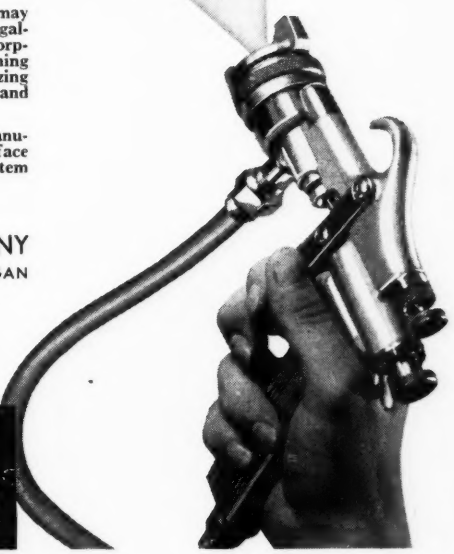

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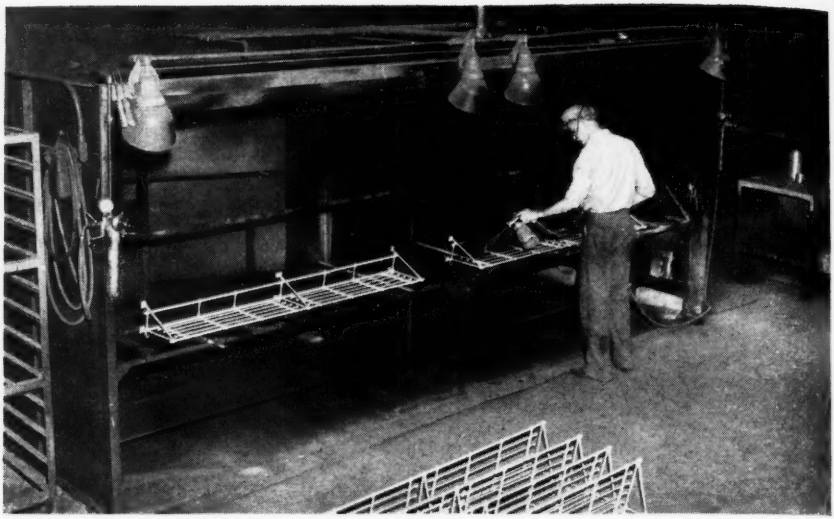

Fig. 7—The operator shown in this illustration sprays miscellaneous small parts.

full car set of 86 sash. Here they are held until the complete overhauling and refinishing of the car, when they are replaced after being cleaned.

Metal covers for fronts of electric equipment are sprayed with a decorative, wrinkle finish. This material is designed as a one-coat finish on sheet metal parts and castings for interior use. Metal covers are sprayed full body, a medium full wet coat, and then allowed to air dry from 15 minutes to two hours, whereupon the metal panels are placed in an electrically heated, thermostatically controlled oven. Temperatures from 200 degrees to 600 degrees F. in this oven are available. However, practically all baking of painted panels at this shop is done on the following schedule: One to two hours at 200 degrees F. or one to one and one-half hours at 225 degrees F.

Trucks for all passenger cars are cleaned at the truck department with a special cleaner, using this material through a steam gun. After this thorough cleaning they are painted by the spray method.

The Beech Grove paint shop, with its modern equipment and modern methods, has greatly reduced the cost of refinishing passenger equipment and has also lessened the time necessary for cars to be out of service for refinishing, which is an item to be considered.

Skilsaw Portable Electric Tools. A catalog designated as No. 42 and containing information on the complete line of Skilsaw Portable Electric Tools is now being issued by Skilsaw, Inc., 4743 Winnemac Ave., Chicago, Ill. Practicability of all tools and their finer construction points are shown in working pictures and in the detailed specifications given for each tool. Copy free.

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Modern Gold Plating

By JOSEPH B. KUSHNER, Ch.E
Metal Finishing Consultant

WHENEVER gold is employed in solid form, whether for jewelry, dentures, or other purposes, it is almost never used pure. In 99 cases out of 100 you will find it as an alloy, combined with other metals, and we speak of it as karat (or carat) gold.* The gold plating industry also does not employ pure gold as a rule, in plating, but prefers to deposit it with other alloying metals.

The reasons for this general practice are fairly obvious. In the first place, gold is too soft to withstand wear. If the Brinnell hardness number of a metal is safe criterion of a metal's ability "to take it," gold is a comparative panty-waist with a B.N. of only 33 (steel is around 200 or more.) In the second place, gold is expensive (since it is sold for $35 a troy ounce) not to be used without an adulterant of some kind. In the third place, the color of gold can be changed by alloying it with other metals. In the solid gold field, the order of importance of these three postulates is just as given, whereas in the gold plating field particularly in flash work, you can read them from the bottom up.

With respect to hardness, the jeweler and the dental technician can, by proper alloying with such metals as copper, silver, zinc, tin, palladium, increase the Brinnell hardness number to well over 100. In fact, in recent times, a heat treating property of certain alloys, first brought to light by Paul D. Merica, world famous metallurgist, known as age or precipitation hardening, has been applied by certain of the dental gold houses to produce dental golds harder than steel. These golds often have B.N.s of 300 or more. This extreme hardness is necessary in order that the dentures withstand the great stresses and abrasive effects of mastication.

As far as the gold plater is concerned, increasing the hardness of a gold deposit is a pretty tough proposition. Many metals will not codeposit with gold under ordinary conditions and if they do, plate out in such small quantity as to barely affect the hardness at all. However, under certain controlled conditions it becomes possible to deposit hard gold

* In the jeweler's lingo 100 per cent pure gold is called 24 karat gold. This is equivalent to saying that a karat is 1/24 part or 4.17 weight per cent. Thus 18 karat gold contains (18 x 4.17) 75 per cent pure gold.

Part 5

deposits, and as a few preliminary experiments by the writer seem to indicate, we may for certain applications be able to age harden some gold deposits. However, this is getting ahead of the story, since we wish to deal with hardness of plated deposits further on.

The factor of reducing cost by lowering the karat of a gold alloy is so obvious and so important to both the plating and the solid gold industry that it requires no discussion save these few words: The solid gold man must stamp a karat mark on his metal so that the consumer knows exactly how much gold he is getting for his money. The gold plater just marks "gold plated" on the tag and the sky's the limit. Of course, there are exceptions to this, as we shall see.

Colored golds arouse considerable interest in both fields of use. The two most common alloy metals used by the solid gold trade are copper and silver. The colors obtainable in thermal alloys of gold, silver and copper range from reds through yellows to greens and whites. With definite, fixed percentages of each metal in a gold alloy, the color is also definite and fixed. A colorimetric gadget that can be attached to a microscope, has been placed on the market, with which a technician can determine the composition of a gold alloyed with copper and silver to closer than 10 per cent. The reflection spectrum of gold, as described in Part 4, combines with those of copper and silver in a regular way so that by rotating a color wheel on a microscope and taking three readings, an analyst can determine the composition of any thermal alloy containing gold, silver and copper, with fair accuracy.

With electrodeposited gold alloys, the story is somewhat different. Even though crystallographic X-Ray studies and microscopic examinations have proven fairly conclusively that alloys can be electrodeposited, or rather, that certain codeposited metals are true alloys, there seems to be some essential difference in the structure of plated gold alloys that causes them to be at variance in their properties with respect to those of the thermal gold alloys of like composition. Thus, with reference to color, electrodeposited gold alloys generally have different colors than solid alloys of the same composition. If it does have the same color, the percentage composition is usually different. Plated golds that **look** like 14 karat almost invariably turn out to be 20-22 karat on assay.

Other properties that are somewhat different are those of density and corrosion resistance. An electrodeposited

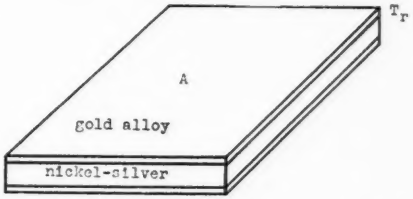

Fig. 12—Diagram showing construction of gold filled or rolled gold stock.

gold alloy is often more dense than its thermal counterpart and it will frequently be found that many of the electrodeposited alloys are more prone to corrosive influences. A common in-

stance of the latter is noticed in plated green golds, which even though they have a high gold content, tarnish up in short order.

Without going too deeply into theoretical matters we may surmise that the difference between thermal gold alloys and the electrodeposited ones (if they truly exist) is a matter of crystal size and shape, and lattice strain. Somewhere, hidden in these factors is the reason for the variance between solid and plated gold alloys.

Whatever the cause for this difference may be, the manufacturer of plated "novelty" jewelry is not interested. He wants to get nice colored finishes on his merchandise. The effect of alloying metals on wearing qualities, is to him inconsequential, as is the effect on corrosion resistance—if he can get a nice colored finish. To protect against wear and tarnish he can always rely on lacquer. But to the manufacturers of better plated jewelry, optical goods, and so on, who are interested in competing with the cheaper forms of solid gold (rolled gold, gold filled) these factors are important. However, we will deal with the color problems of the "novelty" jewelry manufacturer first.

To get colored gold finishes, all we have to do is codeposit gold with one or more metals. For purposes of simplification I have made up a little chart which gives some idea of the possible color effects that are obtainable, either theoretically or practically—by codepositing gold with a single other metal. Most of the metals mentioned can be plated out with gold; some of them cannot and the alloy, if one exists, must be obtained by an artifice, that is, by first depositing one metal, then the other, then by a heat treatment which causes a diffusion of the two into one another. Many of these colored golds are not true alloys but cases of intermittent precipitation. The color descriptions are not necessarily exact but they do give some idea of the possibilities.

This is just a listing of binary alloys. If we start mixing ternary alloys, the fun begins. The possible colors and finishes are increased by an enormous factor. If anyone is interested in determining hypothetically just what color would be obtained

BINARY GOLD ALLOY COLOR CHART

Combination of Metals	Color as Alloy Metal Increases
Gold plus aluminum	Purple
Gold plus arsenic	Greenish hue ..... Dark smut
Gold plus cadmium	Green ..... Yellowish white
Gold plus cobalt	Yellow ..... Whitish
Gold plus copper	Pink ..... Reddish
Gold plus indium	Light blue?
Gold plus iron	Purplish cast .... Green
Gold plus lead	Dark smut
Gold plus nickel	Yellow ..... White
Gold plus palladium	Yellow ..... Off white
Gold plus silver	Green ..... White
Gold plus tin	Yellow ..... Grey white
Gold plus zinc	Yellow... White... Lilac

with a given combination of metals, a suggestion made by Cinammon might be of help: Combine the spectrum reflectance curves of the three metals in question, and calculate the color, interpreting the new reflectance curve made by the addition of the three, as a new color. Of course, if you want to avoid a headache you'll just plate out the three metals and see what you get!

Now comes a few formulas for producing vari-colored golds, for the use of "novelty" jewelry manufacturers before we get to the problems of heavy gold alloy deposition and control. These are formulas that the writer has picked up during the course of a number of years. Some of them are patented formulas, some of them taken from the literature, some of them cooked up by yours truly. The actual ingredients of the bath are given without much reference to control. Furthermore, the list is by no means complete.

WHITE GOLDS

1.

Metallic gold as KAu $(CN)_2$	.125 ounces
Nickel as double cyanide	.675 ounces
Free cyanide	.05 ounces
Water	1 gallon
Current density	36-200 amps./sq. ft.

Deposits containing 15-20 per cent nickel can be obtained with this bath. A 15 per cent content of nickel (20k) gives a fine white plate.

2.

Gold as potassium aurocyanide	.65 ounces
Potassium cyanide	2.0 ounces
Potassium hydroxide	3.0 ounces
Potassium stannate	11.5 ounces
Water	1 gallon
Voltage	1.8-5 volts

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(5) Easy to apply—"dip and force dry" method.
(6) Light in color—easy to see how well the rack is covered.
(7) Any part of rack can be recoated without recoating entire rack.

Write for Bulletin No. 31
Containing Complete Information.

Platers without rack coating facilities may have their racks coated with "Unichrome"* Rack-Coating-W by Chromium Corporation of America, 4645 West Chicago Avenue, Chicago, Ill.; Belke Manufacturing Company, 947 North Cicero Avenue, Chicago, Ill.; or Lea Manufacturing Co., Waterbury, Conn.

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Alloys with a tin content below 30 per cent shows a slight yellow cast. The greyness of alloys above this percentage can be removed by buffing.

GREEN GOLD

3.

Potassium gold cyanide	.50 ounces
Cadmium oxide	.125 ounces
Potassium cyanide	2.0 ounces
Potassium hydroxide	.125 ounces
Sodium bisulfite	.125 ounces
Water	1 gallon
Voltage	4-5 volts
Temperature	160-180 deg. F.

4.

Potassium gold cyanide	.50 ounces
Silver cyanide	.05 ounces
Potassium cyanide	1.5 ounces
Water	1 gallon
Voltage	2-6 volts
Temperature	160 deg. F.

PINK GOLD

5.

Gold potassium cyanide	.50 ounces
Copper cyanide	.125 ounces
Potassium cyanide	3.00 ounces
Water	1 gallon
Voltage	3 volts
Temperature	120 deg. F.

LILAC GOLD*

6.

Gold as fulminate	.27 ounces
Potassium cyanide	2.0 ounces
Potassium zinc cyanide	6.7 ounces
Current density	900 amps./sq. ft.
Temperature	158 deg. F.

At a zinc content of 30 per cent in the deposit (17k) the lilac color develops. It is important that the work is not agitated as agitation prevents the formation of the lilac or lavender color.

PALE YELLOW GOLD*

7.

Potassium gold cyanide	.5 ounces
Nickel formate	saturated sol.
Water	1 gallon
Temperature	86 deg. F.
Current density	1.8-2 amps./sq. ft.

The solution is kept saturated with nickel formate by making sure that a number of undissolved nickel formate crystals are lying on the bottom of the tank.

The list of a few colored alloy (binary) golds on Page 22 gives some idea of the possibilities open to the "novelty" jewelry manufacturer. There are even wider possibilities when it comes to ternary alloys and formulas for co-depositing them will be given under the discussion of heavy alloy gold plating. But in passing we note the interesting fact that some of the formulas require the use of very high current densities. Many platers do not believe you can plate gold at such high current densities because they themselves have not tried it. They go by what is written in standard texts and guidebooks. These texts generally make the statement that gold is plated at an average current density of 5 amperes per sq. ft. which is true for old type gilding baths only. The writer recalls with amusement mentioning at a meeting of N. Y. branch of the Electroplaters' Society several years ago, that nickel could be easily codeposited with gold at high current densities and being greeted with a variety of outcrys euphemistically referred to as "Bronx Cheers." The fact remains, that gold can be codeposited with nickel to give excellent appearing white gold alloys.

HEAVY DEPOSITION OF GOLD ALLOYS

The largest users of gold plating

* Patented.

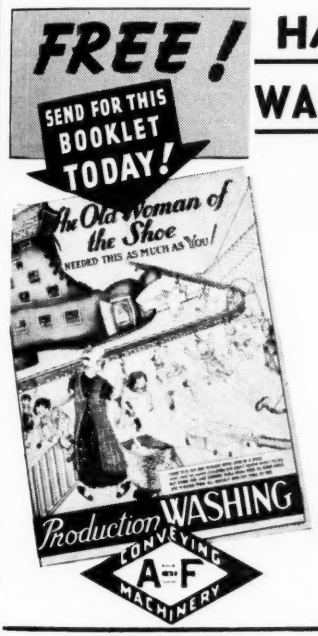
are the novelty jewelry manufacturers but there are considerable amounts of other users who manufacture optical goods, better grade jewelry, musical instruments, watch cases, and so on, who are interested in heavy gold deposition. They have as a choice the use of heavy gold plating or the use of rolled gold or gold filled stock. In the past, many of the makers of better grade jewelry and optical goods have used rolled gold almost exclusively. Let us compare the two and see why.

Rolled gold and gold filled are used synonomously in this paper, though at one time rolled gold meant sweating on a single layer of gold to the basis metal and gold filled meant sweating on a layer of gold on both sides of the basis metal.

Rolled gold or gold filled is made by sweating together two layers of solid gold stock of a given karat to either side of a much thicker layer of nickel silver or other basis metal. This is then rolled down to proper dimensions and becomes the stock metal from which manufacturers stamp out and form their goods. The thickness and the karat of the gold alloy is calculated so that a manufacturer can stamp on his finished product a symbol such as this one: 1/10-14K. This means that one tenth of the total weight of the object consists of 14 karat gold.

Rolled gold is excellent for a number of uses but it has two points which cannot be overlooked. First, there is a considerable amount of waste and loss in stamping out objects from rolled gold. Second, the stampings have "raw" edges through which the base metal is exposed.

Of course, scraps from the stamp-



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ing and forming processes are sent back to the refiners and a certain amount of credit is obtained for the gold on them, but these scraps, like the cuttings on a garment house floor represent an actual loss. The "raw" edges with base metal exposed tend to make the formed objects subject to corrosion. However, in many applications the raw edge is avoided by beading, or electroplating after the object is formed.

The plating of gold alloys is, as far as these two factors are concerned, certainly superior. Under proper control, a definite amount of gold may be put on each fabricated piece, so there is no loss as far as gold is concerned. Then, electroplating covers every part of the object so that no raw metal is exposed and corrosion is materially reduced.*

There is a tendency for electrodeposited alloys to be deposited more heavily at the edges and high spots of an object than at the center and low points but this is no serious handicap and, in fact, is probably a distinct advantage because in most cases the wear is greatest at these points.

The two objections those in industry have had to the use of heavy plated gold deposits is that the color cannot be controlled and the plated deposit will not wear long enough (equivalent to saying the plated deposit is not hard enough). They know that when they get a rolled gold alloy (thermal alloy) of a certain karat it will always have a fixed color, a color they can depend upon, whereas if the gold alloy is plated on they may not be able to obtain the same color match. They also knew that most heavy plated gold deposits wear through more quickly than rolled gold plates containing the same amount of gold.

These are serious drawbacks if true, but fortunately they are not. The color of a gold deposit may be maintained with constancy if proper control measures are taken. As for lack of hardness, modern practice has, and is proving that it is time we discarded the idea of not being able to deposit really hard gold alloys.

A third and minor objection to plating heavy gold alloys which really connects up with the wearing qualities, is the factor of adherence. Claim is made that plated gold does not adhere as solidly to the basis metal as rolled gold does. While the author is not aware of any comparative measurements on the adhesion of the two, the chances are that gold properly plated on a properly cleaned piece of work will adhere as well as gold that has been rolled or sweated on. Experiments on other plated metals, particularly those of Hothersall, have shown that enormously powerful attractive forces are at work when one metal is plated on another and the plating of gold is no exception. In addition, we have the example of the silver plating industry. Very heavy deposits of silver are plated on nickel-silver and steel to which these deposits stick tighter than the proverbial penny to a Scotchman.

The actual reason for the lack of wearing qualities of plated gold that attempts to compete with rolled gold on equal terms is this: The plated gold alloy is generally too high in gold content and, because of this is too thin. Let us see why.

Take a thin sheet of nickel silver stock metal whose area is A sq. ft. and whose weight is 1 lb. We desire to produce a gold filled plate on it which is to be stamped 1/10-14 K, which means one tenth of the total weight of the object will be 14 karat

*This statement in no way conflicts with the statement made previously that certain plated alloys show a tendency towards tarnishing rapidly. We are referring here to those that do not.

gold. If W is the weight of the 14 karat gold deposit we must put on, then, $.1\ (1+W) = W$ and $W = 1/9$ lb. or 1.775 av. ounces of 14 karat gold, the total gold content of which is $\frac{14}{24} \times 1.775 = 1.035$ av. oz. of pure gold. The 14 karat alloy will be sweated on to both sides of the nickel silver sheet so half of it or 1/18 lb. will be on one side of the nickel silver and the other half on the other side as shown in Fig. 12. How thick will this layer of 14 karat gold be? If the thickness of the layer is called Tr, we get the following calculation:

$$A \times Tr \times Dr = \frac{1}{18}$$

where A is the area, and Dr is the specific gravity of the 14 karat gold plate. Rearranging gives the expression for the thickness:

$$Tr = \frac{1}{18 \times A \times Dr}$$

Now consider electroplating a gold alloy on this same base metal sheet to meet the same specifications, that is, 1/10 of the total weight shall be 14 karat gold. To meet it we shall have to deposit as before, 1.035 ozs. of pure gold in the form of an alloy. With ordinary methods we will be able to deposit an alloy that will look like 14 karat gold but on assay it will have an actual 20 or 22 karat composition. Let us assume the true karat of the gold deposited is 22. Then in order to put on 1.035 ounces of pure gold we will have to deposit $\frac{24}{22} \times 1.035 = 1.13$ ounces of our alloy plate. Assuming for the moment that the edges of the piece take no deposit (they do) then this weight of gold alloy will be distributed equally over

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the two faces and on each face we will have .565 ounces of our 22k alloy. The thickness of the deposit will be, using the same formula as previously given, where Tp is the thickness of the plated deposit and Dp is the spefic gravity of the plated deposit:

$$Tp = \frac{.565}{A \times Dp \times 16}$$

We are merely interested in comparing the thicknesses of the two, or their ratio, thus:

$$\frac{Tr}{Tp} = \frac{\frac{1}{\frac{18 \times A \times Dr}{.565}}}{\frac{A \times Dp \times 16}{}} = \frac{Dp \times 16}{.565 \times Dr \times 18}$$

The specific gravity of 22 karat gold is approximately 17.5 and that of 14 karat gold is 15, so

$$\frac{Tr}{Tp} = \frac{17.5 \times 16}{.565 \times 15 \times 18} = 1.84$$

or in other words, the rolled gold plate is 1.84 times (almost two) as thick on a side as the electro plated gold plate!

This explains very largely why the electro plated gold plate suffers in comparison with the rolled gold plate on the point of wear. Not only is the plated gold alloy less hard but it is also less thick and so it quickly wears away. Indeed this is one of the main reasons why the stamping laws do not permit a manufacturer to put a stamping such as 1/10-14k on electroplated ware. (At one time it was possible to so stamp plated ware if the proper amount of gold were put on to make the statement true but a discussion of this phase will take us into politics and this is supposed to be a paper on plating.) For a long time rolled gold was the invariable choice between the two possibilities because of this point, but with the advent of scientific gold plating a halt has been called on this runaway lead of rolled gold over plated gold and in many places electrodeposited gold alloys are gradually replacing rolled gold.

(To be continued.)

"Things and Stuff" is the title of a house organ which is now being issued by The Service Caster & Truck Co., 980 N. Brownswood Ave., Albion, Mich., containing descriptive information and illustrations regarding some of the various material handling equipment available from the company. The house organ will be issued at regular intervals and can be obtained free upon request.

Penco Steel Lockers, Cabinets, and Shelves are the subject of a 28-page, pocket-size, illustrated booklet, designated as the No. 44 Series A, which is now being issued by the Penn Metal Corp. of Penna., 36 Oregon Ave., Philadelphia, Pa. The booklet gives detailed specifications and prices of heavy gauge steel lockers, cabinets, and shelving, summarizing applications, and points out possible savings in floor space, material handling time, and tool control operations. Copy free upon request.

Industrial Electro-Chemistry. This 656 page book now being published by McGraw-Hill Book Company, Inc., New York City, New York, endeavors to point out and emphasize the technological importance of electro-chemical processes, to stress their practical aspects, and to adopt the engineering viewpoint. The information is presented clearly and concisely by the author, C. L. Mantell, Ph.D., Consulting Chemical Engineer, New York.

The contents is divided into 6 parts as follows: Part 1, Theoretical Electrochemistry; Part 2, Technical Electrochemistry; Part 3, Electrolytics; Part 4, Electrothermics; Part 5, Electrochemistry of Glass; Part 6, Engineering.

Copies of Industrial Electro-Chemistry can be obtained by writing to the Publishers, The McGraw-Hill Book Company, Inc., 330 West 42nd Street, New York City, N. Y. The price is $5.50 per copy.

Finishing Equipment Catalog. The Industrial Sheet Metal Works, 630 E. Forest Ave., Detroit, Mich., is now issuing an attractive spiral-bound catalog describing and illustrating the various products the company manufactures. The catalog shows types of spray booths, drying ovens, parts washers, and several miscellaneous items of allied nature.

The company supplies not only these items which it builds, but also engineers the complete installation and furnishes all the other related equipment, such as heaters, fans, controls, conveyors, hoists, and so on. Thus, all the elements are properly correlated and the entire equipment can be made to function more efficiently. This service is also described in the catalog. Copy free upon request.

How to Save Money Handling Your Loads. Seven typical steps common to most industries, and each a spot where waste may occur in materials handling, are described in a 12-page illustrated bulletin issued by Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland, Ohio.

From incoming car to the receiving department; receiving to storage; storage to processing; through the processing department; into storage; from storage to packing; and then into the outgoing car or motor truck, are the seven steps. Conserving the most money in materials handling is accomplished by transporting loads with power industrial trucks through each of the seven steps, not merely at one or two points.

With continuity, says the bulletin, large cash savings in the cost of handling loads through production are simply the total of such savings in each department. The author advocated abolishment of the "teaspoon method" of material handling, and the elimination of clogged plant aisles through keeping material on the move.

The bulletin, "How to Save Money Handling Your Loads," may be obtained free upon request.

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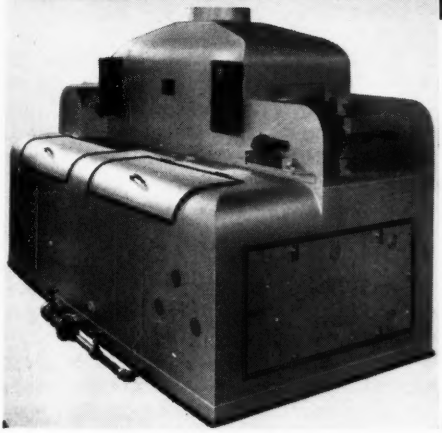

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Barrel Finishing

Abrasion and Impingement as applied to Barrel Finishing Procedure

By H. LEROY BEAVER
Lansdale, Pennsylvania

IN the present discussion we wish to differentiate between two words. Each one of the words is expressive of a definite action in its own implication, but in many cases the words are used as though they were synonymous.

To hear a person speak of a finish obtained by the use of abrasives does not necessarily determine the manner in which the abrasive was applied, because abrasives may be used in a variety of metal finishing methods such as grinding, scouring, polishing, buffing or in various revolving barrel operations. Some writers on the subject of some phases of barrel finishing have even gone so far as to suggest that a "peening" operation is used in reducing surface area in speaking of the particular barreling operation in which some part of surface area is removed in conjunction with some form of abrasive material.

To one not completely informed as to just what happens in a burnishing barrel while that barrel is in operation, these terms at times become quite confusing. We have very good reason to know of this confusion if we may judge by the indiscriminate use of conflicting terms to express an identical operation.

The two terms we would like to discuss are Abrasion and Impingement. These terms have entirely different meanings, and perhaps we had best study briefly some formal definition of the terms themselves.

Abrasion is derived from two Latin words AB meaning **off** and RADERE, **to scrape,** hence to scrape off, in other words, an application of a process of rubbing down or wearing off by one part moving against another. This condition might be illustrated by the wearing away of the surface of coins carried in one's pocket. For our discussion, the term is more aptly applied when used in a mechanical sense and where it relates to some operation used mechanically for shaping, finishing or polishing of metal parts.

Impingement is perhaps most simply expressed as impact or collision and is a pressure of short duration exerted between two bodies. The effects of impact are sometimes an alteration of the distribution of actual energy between the two bodies and always involves a loss of a portion of that energy, depending on the imper-

...inf Metal Products

fection of the elasticity of the bodies in permanently altering their figures and producing heat. The determination of the distribution of the actual energy after collision and of the loss of energy is affected by means of the following principles:

1. The motion of the common center of gravity of the two bodies is unchanged by the collision, and
2. The loss of energy consists of a certain proportion of that part of the actual energy of the bodies which is due to their motion relative to their common center of gravity.

Unless there is some special reason for using impact or finishing by the force of impingement in a barrel finishing operation it should be avoided, not only on account of the waste of energy which it causes, but also from the damage which it causes to parts in process.

In metal finishing practice today, it is not difficult to point to two very simple operations wherein the two terms under discussion would apply very beautifully and be easily understood. These operations are: the reduction of surface by an appropriate barreling operation wherein abrasives are used and another operation known as sand blasting where abrasives are also used for the reduction of surface area. The barrel finishing operation would be designated as Abrasion while the sand blasting operation would be designated as Impingement.

For a comparison of finishes obtained by these two forces let us select some common form of part that would be susceptible to finishing by either operation. In this case it might be small castings where the principal problem was the removal of scale from the surface prior to further finishing treatment. Such scale may be removed by either process, but the resulting surface finish will be entirely different in character. In a barreling operation, the parts would be operated preferably with some form of cushioning material such as soft annealed steel balls which would be the weight carrying medium used for holding the abrasive firmly to the surface of the parts. Water, as the liquid for carrying the abrasive material, would be normally added in the proportion of from one to one and one-half pounds of abrasive to each gallon of water used. The abrasive may be and very often is 180 grain. Now by a slowly restrained barrel motion, the mass of burnishing material and parts are caused to flow. In this flowing action of the mass the parts run across the surface of other parts as well as the contact points of the burnishing materials. In this way scale is abraded, scoured or ground off, leaving a very fine matte surface and very little, if any, of the abrasive material will be found embedded in the surface of the parts.

Now if we take the same type of parts and the same grit or grain of abrasive and undertake to remove the scale by some action of impact or im-

pingement such as we would have in sandblasting, we here find that instead of a flowing rubbing or scouring operation we have the abrasive brought into contact with the surface of the part by being carried at great force in a blast of air. While this operation is effective for the removal of the scale on the surface the final finish of the part differs materially from that of the identical parts if operated in a barrel as previously described. The continual impact of the abrasive particles on those areas where the scale is quickly removed will result in small particles of the abrasive material being driven into the surface of the part where they might cause some difficulty to subsequent operations of the deposition of the various metals. If the parts were to have some organic finish such as painting, lacquering, and so on, this effect of small particles of abrasive being imbedded in the surface of the parts would not be so serious. On parts, however, that are to be plated, the surface obtained in the barreling operation would be found unusually satisfactory.

Now while it is true that a finish equivalent to that obtained in the barrel cannot be gained by any impact operation or blasting, this is not true of the situation if reversed. It will be noted that we specifically speak of a restrained operation of the barrel on all grinding operations, for the very simple reason that speed of operation is not the grinding factor, but continuous pressure within the mass is. If we were to speed up the barrel so that the parts and mass would be thrown about, we could very quickly pass from a finish obtained by abrasion as we have defined it, to one of impact, such as would be had in the sandblasting operation. Not only that, but in addition to particles of abrasive being driven into the surface of the parts, we would also obtain nicks and digs in the surface and especially on edges and angles that would be detrimental to obtaining a satisfactory final finish. True, there are many cases where sandblasting is used as an operation preliminary to a barreling operation.

Now, regarding barrels in which parts may be adequately prepared, it seems that irrespective of the operations which we from time to time describe, many readers seem to assume that it makes little difference what size or type of barrel is used, and that whatever they might have installed will do just as well as anything else. This of course, is not true. As we have so many times explained we have two leading types of barrels used in American Industry, the high and narrow and long and narrow types, which we have designated as the Abbott and Baird Types, but whichever type of barrel is used, its size or load carrying capacity must be such as to provide for effective pressure to be developed in the flowing burnishing mass. To assume that Abbott is the only high and narrow type available is wrong because Globe barrels are almost identical in size and operating characteristics. It is also an error to assume that Baird confines itself to only two sizes of Baird Burnishing Machines because Baird produces many types of barrels and its horizontal types range in size from 20 in. x 30 in. to 30 in. x 40 in. in size. These barrels adequately carry loads of from 4½ to 13 bushels and bulk weights from 500 to 1500 pounds at a single load. In addition to this, we have many individual manufacturers of larger types of barrels for many operations, such as, for example, the specially constructed and designed barrels produced by Storts Welding Company of Meriden, Conn., which differ from the

conventional barrels in that they are all formed from steel plates. After a close examination of several of these barrels, we would say that they represent materpieces in welding.

One of the reasons that in many barreling operations we have impact finishes may be directly traced to the use of perfectly round cylinders for the barrel body. In such a body, and at what we would consider the proper operating speed, the load of material in the barrel simply will not lift. In many cases, lateral ribs are bolted to the inner surface of the barrel which only carries the load too high and causes it to spill over at the top with the result that parts falling from the mass strike other parts at the bottom of the mass resulting in nicks and digs that only require hours of additional operation to clean up. Next to a circle, an octagon will enclose the most space and for this reason eight sided barrels have come into almost universal use and they are to be preferred to any simple round cylindrical form.

On many parts these operations for removing scale and reducing surface area can also be adequately carried out in what is known as the oblique tilting types of barrels, but it also must be borne in mind that this type of barrel is made in a wide variety of sizes and the larger size should be selected in order that adequate weights of materials may be operated for more rapid results.

In any of these operations for the removal of surface and where closed types of barrels are used we must again caution the operator to see to it that the barrel or barrels all contain suitable gas vents. Many of these operations consume several hours of operating time, and in this time gases develop and the air is ex-

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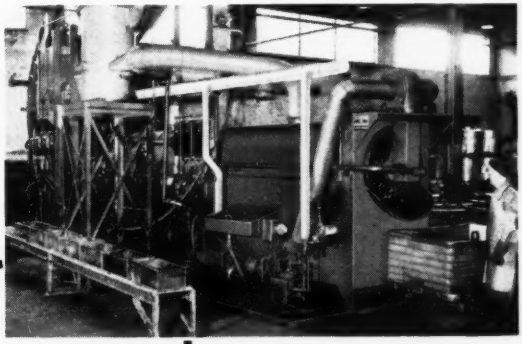

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panded by the heat developed in the friction within the mass. If this heated air and gas is not properly vented it may build up to a point that the barrel will explode. To prevent such a condition, if the barrel is fitted with a vent it should be checked carefully to see that it is functioning properly, and if the barrel does not have a vent it is well to loosen the lid occasionally during the operating cycle to permit gas and heated air to escape.

In a barreling operation for the removal of surface with abrasives the loading differs somewhat from that used in the conventional wood lined barrel where the burnishing operation which removes no part of the surface is carried out. Loads of two-thirds full are the rule in burnishing, but it has been learned that in abrasive operations, faster results are obtained by simply loading the barrel slightly more than one-half full which provides for a longer flow of the material down the inclined plane of the burnishing mass.

To undertake to enumerate all of the materials used as abrasive agents in operations such as herein indicated would mean to run the gamut of Mohs' scale all the way from 1 to 9. Many operations may be successfully carried out with materials available nearest to the factory where the work is being performed, such as a bank of sharp sand, and in other cases, hard cinders from the boiler room, gravel or other media that would lend itself to abrasive action.

The various factors of pitting caused by organics in the water supply, and the method used to overcome such action have been discussed in previous papers as have also the effect obtained by the use of water and abrasive as distinguished from oil and abrasive, hence we do not deem it necessary to repeat such factors at this time.

Cleaning of Metals Before Electroplating. Prepared for works managers, production managers, plating supervisors, and contract finishing shops is an interesting, illustrated, 32-page booklet outlining formulas and methods for cleaning many different metals and alloys before electroplating now being issued by Oakite Products, Inc., 20 Thames St., New York City.

To plating department superintendents seeking a handy, compact guide on the most recent developments in materials and methods designed expressly for quickly cleaning metal stampings, castings, and parts before electroplating, this booklet will prove a helpful addition to their reference files. It describes new and improved methods for safely cleaning aluminum, magnesium, and their alloys before plating, anodizing or various other surface treatments used in connection with them; cleaning polished steel without pre-soaking or subsequent wiping or brushing operations; cleaning buffed brass, bronze, and other copper alloys; cleaning iron and steel castings, zinc and zinc base alloy die castings, cold rolled steel, antimonial lead die castings, and tin alloys.

Considerable data is also included on such other operations as tumbling and burnishing, etching aluminum, reclaiming rusted parts, cleaning before pickling and eliminating water stains on plated work.

Supplementing all this information are many helpful hints on tank installations and other factors which, beyond use of proper cleaning material, may largely govern plating results and costs. Subjects discussed in this connection include still and electric cleaning tanks, sizes of steam coils required for heating tanks, rinsing facilities and control of cleaning solution concentration and temperature.

Copies of this fact-filled booklet are available upon request to Oakite Products, Inc., 20 Thames St., New York City.

DeBothezat Paint Spray Booth Fan. A paint spray booth fan with guaranteed performance ratings is described in

an 8-page catalog now being distributed by the DeBothezat Ventilating Equipment Division, American Machine and Metals, Inc., Anderson and Mumford Sts., East Moline, Ill. The fan is said to assure required protection against hazards of spray painting under all operating conditions.

Being built to Underwriters' specifications, the fan is corrosion resisting and non-sparking. The motor is substantially mounted and perfectly balanced outside the fan housing on an adjustable base, and power is transmitted by V belts through a vapor drive chamber. The fan wheels are of die-formed aluminum, and the blades are said to be easily removable for cleaning.

The circular with complete ratings for the standard sizes of 18 in. to 42 in. will be sent free upon request.

How to Eliminate Dirt Hazards. A new four-page illustrated folder titled "Dirt Is a Critical Hazard" and describing the application, operation, and dirt removing qualities of the Precipitron electrostatic air cleaner is announced by the Westinghouse Electric & Manufacturing Company.

This attractive and informative folder tells briefly the complete story of the Precipitron and how it removes harmful dirt from the air. Successive paragraphs tell what the electrostatic cleaner is, how it operates, and why it is very efficient. Sketches and other illustrations aid the reader throughout the explanations.

Places and industries where air cleaning can save money or valuable merchandise are listed. Installation and cleaning capacities are briefly covered, with a cutaway picture of a typical Precipitron installation included.

Last page of the folder contains a list of successful Precipitron installations in various industrial and commercial locations. Capacities of these installations are listed to give those interested a general idea of the extent of air cleaning necessary.

Copies of folder F-8501 may be obtained upon request from the Precipitron Department of the Westinghouse Electric & Manufacturing Company, Edgewater Park, Cleveland, Ohio.

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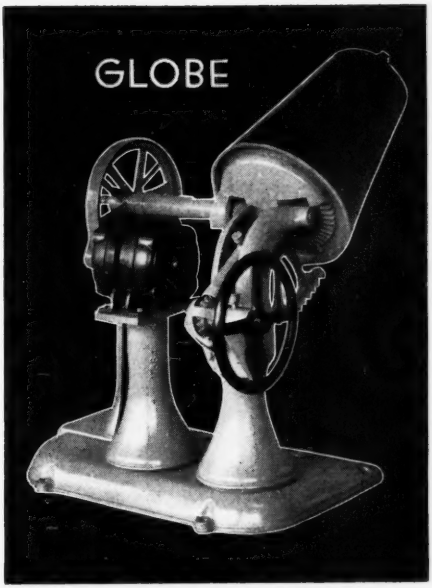

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Electroplating: Past and Forecast

By BUZZ BARR

IT is customary at the end of a calendar year to summarize and review the events of the 365 days gone by. This is done in every industry and the electroplating field is no exception and so with pen in hand we'll jot down a resume:

Because of the war situation, European research in electro-deposition has almost reached the vanishing point as far as commercial developments are concerned. Right now those war babies may be cooking up super hard chromium deposits .001 in. thick, to be used as armor plate, but they aren't talking, consequently we don't know. The Russians, nominally a nation at peace, seem to be the only ones contributing any advancements of consequence at the present moment.

In America—God Bless Her—the situation is different. Here the lamp of liberty still burns and plating research continues; commercial plating development appear with ever increasing frequency. Here are some of the technical and scientific advances of electrodeposition in 1940:

BRASS PLATING

A new development in brass plating from cyanide solutions makes it possible to deposit heavy, lustrous brass plates in relatively short periods of time. The new process which seems to be a logical offshoot of the high speed copper process brought out by the same company two years ago appears to offer many advantages over the old style brass bath. It eliminates polarization of the anodes (the bane of the old brass bath) permits higher cathode current densities and seems to give more uniform colors. The specifications according to the supplier are:

Composition

Metal salts.....3.4 lbs./gal.
Addition agent .....2.0 ccs./gal.
Temperature of operation
.....105-125 deg. F.
Anode current density
.....25 amps./sq. ft.
Anode efficiency.....90-95 per cent
Cathode current density
.....25 amps./sq. ft.
Cathode efficiency.....50-80 per cent

COPPER PLATING

Another step forward has been made in this field by the introduction of a mirror bright process of copper plating from solutions containing ammines and ammonium salts. The copper deposits from this bath are ductile, and strongly adherent over a wide range of current densities, furthermore they are uniformly bright throughout the range. The current

efficiency is approximately 100 per cent (copper dissolves divalently). The plating of steel and zinc die castings with it, requires a preliminary flash in a copper cyanide solution. The greatest advantage appears to be in the mirror brightness obtainable. The specifications of this solution according to the patent:

Copper sulphate .....100 grams/liter
Diethylene triamine.....80 ccs./liter
Ammonium sulphate..20 grams/liter
Temperature .....120-140 deg. F.
Current density...40-50 amps./sq. ft.

A study was made of the **stresses in electrodeposited copper** by means of X Ray diffraction. This study by **E. M. Mahla** showed that at low temperatures, the temperature was the controlling factor in determining the stresses in the deposit whereas at higher temperatures, the current density was the most important factor.

Another study on the **electrolysis of sodium cuproxcyanide** solutions was made by **J. V. Petrocelli** who determined the anode and cathode polarization values of copper for varying concentrations of sodium cuprocyanide.

CHROMIUM PLATING

In the field of chromium plating there were no new startling developments. Chromium plating is now being used with ever increasing frequency, however, for protection of parts subject to wear and the plating of molds for the plastic industry.

A paper by Logozzo at the American Electroplaters' Convention in June gave a detailed description of the process for chromium plating molds for the plastics industry. Mr. Logozzo pointed out the advantages of chromium plating molds by showing that chromium plated molds last

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longer, are less influenced by the chemicals contained in the plastics, require less breaking in, provide higher finishes with less breakage and a better flow of the molding compound.

A paper by Van Der Horst, Dutch Plating Engineer who is now in this country, described the hard chromium plating of Diesel engine cylinder bores giving the advantages of extra long wear and service life.

Some refinements in the spot test for determining chromium plating thickness were described by Blum and Olsen of the National Bureau of Standards. An electrochemical method of thickness testing of chromium plates was described at the fall meeting of the Electrochemical Society.

GOLD PLATING

As usual, there were no advances in the art of gold plating, the practice remained about the same. A paper by Oldham described possible sources of loss in gold plating. A paper by Young briefly discussed Gold Alloy plating. A comprehensive series of articles on modern gold plating by Kushner started this past year, is appearing in this periodical.

LEAD PLATING

A new acetate bath for lead plating was described by Mathers and Schwartzkopf at the American Electroplaters' Convention. The specifications are as follows:

Lead acetate	10 grams
Sodium acetate	12-16 grams
Acetic acid	2 grams
Glue	.4-.6 grams
Cresol (in NaOH solution)	3-4 drops
Water	100 milliliters
Current density	11 amps./sq. ft.

NICKEL PLATING

The bright nickel plating processes are constantly being improved, and developments continue apace. A comprehensive resume of modern bright nickel plating processes was given at the Platers' Conventions by Young. Two papers on the effect of the basis metal treatment on nickel deposits were also given at the same convention.

A study was made by Cuthbertson of the structure of heavy nickel deposits. Deposition of nickel from chloride solutions was described by Wesley in this magazine. Other papers appeared discussing general bright nickel plating practice with full automatic equipment.

SILVER PLATING

In silver plating the practice has remained virtually the same and no new processes have been announced. A paper delivered at the American Electroplaters' Convention seems to indicate that it is possible to plate silver at high current densities such as 200 amperes per sq. foot if proper agitation is maintained. Some further studies were made of bright silver plating and the indications are that the complex sulfur bearing organics make excellent brighteners for silver plating baths.

TIN PLATING

With the war going full blast there has been a renewed interest in tin plating. A comprehensive study of the sodium stannate bath was made by F. Bauch which has lead him to the following conclusions: 1. Bivalent tin ions in a sodium stannate bath cause porous and blistered deposits. 2. The anode current density must be

maintained fairly constant within a certain range.

ZINC PLATING

In the matter of zinc plating some new types of bright plating baths have been developed. One of these new baths as described from its patent specifications is the following:

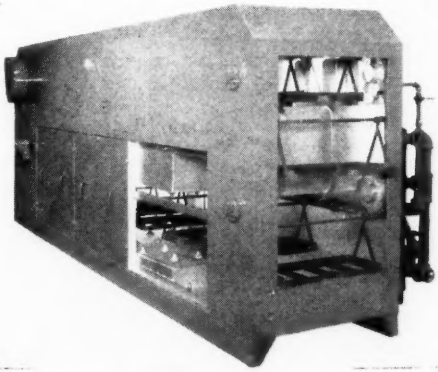
Zinc cyanide	60 grams/liter
Caustic soda	78 grams/liter
Sodium cyanide	42 grams/liter
Piperonal	1 gram /liter
Gelatin	.1 gram /liter

A new process for electrogalvanizing using solutions leached from zinc concentrates was described and patented by Louis Weisberg. New type of zinc anodes were described by Hull.

General Developments

METAL COLORING: A series of articles describing every phase of metal coloring by Kushner, appeared in Products Finishing. Several patents were granted to the Alleghany Ludlum Steel Corp. for metal coloring processes for stainless steel.

ELECTROPOLISHING: Keen interest was aroused during the year in electropolishing, or as some prefer to call it, electrosmoothing. Studies were made giving more of the theoretical aspects of the subject and a number of commercial processes were developed to a point of practicality. There are many plants now in operation in which stainless steel objects are given an extremely lustrous finish with the elimination of most of the tedious hand or machine polishing op-



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erations. While steel seems to be the metal with which best results are being obtained, new processes for aluminum, and other metals, are gradually appearing.

CLEANING: Many papers appeared on metal cleaning during the past year, most of them written by employees of the cleaner supply companies. The increasing use of anodic cleaning methods and the use of newer types of wetting agents and detergents have improved the metal cleaning processes to a marked degree. Several of the newer methods actually remove carbon smut in one treatment.

PLATING ON ZINC DIE CASTINGS: Several papers appeared on the practice of plating zinc die castings. Improved cleaning processes have reduced blistering and peeling to a minimum. Plating procedures have become highly standardized. A new method for stripping copper from zinc die castings was described by Stoddard. The method involves the use of chromic acid solutions at fixed concentrations plus alternating current.

RECTIFIERS: The use of plating rectifiers has increased considerably during the past year. Several papers on the subject appeared in the technical journals. Kushner described the selenium rectifier, latest type to enter the field, the magnesium sulfide and copper oxide rectifiers.

PLATING ECONOMICS: During the year a number of studies were made of the economics of plating. A paper on disposal of plating wastes was given at the American Electroplaters' Convention. Another paper was given on increasing plating room efficiency and reducing labor costs. A paper by Bregman described the making of plating work bids or estimates. A paper appeared on patents.

PLATING HEALTH HAZARDS: Several writers have described in great detail the hazards to health that may be found in metal finishing operations. Improved conditions and equipment have been recommended.

PLATING THEORY: In the matter of theory there was a very excellent paper by Zapffe on the effects of hydrogen in metal plating and finishing. The usual paper by Kaspar appeared in the Proceedings of the Electrochemical Society, on conduction of current through an electrolyte, and so on. A new method for studying cathode films in plating was described by Brenner of the Bureau of Standards. The method involves suddenly freezing the electrolyte and peeling off the frozen layers closest to the cathode. A comprehensive study of alloy deposition was made. Paper appeared on the deposition of metals from the sulfate solutions. The effect of moving cathodes on electrodeposition was also described at the American Electroplaters' Convention.

We hope we have covered most of the important items in this necessarily brief review and now we are going to stick our necks out with the following prognostications of things to come during 1941: Look out for (1) Increased use of plating rectifiers. The newer types are designed to operate with maximum efficiency. (2) Increasing use of higher current, higher metal concentration, bright plating baths. (3) The appearance of a really bright silver plating process. (4) Increased use of specifications for plated deposits and a greater interest in plating control. (5) New electropolishing methods.

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Electro-Matic Self-Cleaning Air Filter Model "C." Bulletin No. 250-C covering the improved Model "C" Electro-Matic Air Filter, product of the American Air Filter Co., Inc., 696 Central Ave., Louisville, Ky., has been released by this firm. Consisting of 16 pages, the bulletin describes and illustrates the construction and operation of the Model "C" filter in terms that can be understood by either the engineer or layman. Diagrams and cut-away sections show how electrical precipitation and automatic air filtration have been combined in a compact self-contained unit requiring no outside electrical connections other than an ordinary 110-volt a.c. lighting circuit. Copy of the bulletin free upon request.

Rubber Latex. A practical and useful book on rubber latex containing such recent information as chemically modified rubbers from latex, botanical significance of latex, microscopic descriptions and illustrations, analytical determinations, preservatives, and so on.

In order that the subject matter may be understood by those having little or no specialized knowledge, scientific terms and theoretical explanations have been avoided as far as possible; but when it has been necessary to introduce such subjects, an explanation has been usually given in the simplest possible wording.

It has been desired to make this work of use to as wide a circle of readers as practicable and to encourage investigation even for those with no previous scientific training.

The content of the book is divided into the following chapters: Source and Production of Latex; The Properties of Latex; Concentration of Latex; Manipulation and Compounding of Latex and Latex Products; Vulcanization of Latex and Latex Products; Manufacturing from Latex; Applications and Products of Latex; The Marketing of Latex; and Patents.

A copy of this book may be had by writing to the Chemical Publishing Co., Inc., 148 Lafayette St., New York, N. Y. The price of this book is $2.00.

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Magnus CLEANERS

Review of Progress in the Industrial Finishing Field

By G. KLINKENSTEIN
Vice-President and Technical Director
Maas & Waldstein Co., Newark, N. J.

DURING the year 1940, the manufacturers of lacquers and enamels for industrial finishing purposes developed several new products of special interest. They also cooperated with the government in carrying on the national defense program.

National Defense

Industrial finishes play an important part in national defense. They are needed, especially, for the following purposes:

1. **Providing protection.** Modern finishes have excellent resistance to the destructive effects of atmospheric elements and commonly used chemicals and prolong the useful life of metal and wood products many months, thus reducing normal wastage.

2. **Rendering equipment inconspicuous.** Lacquers and enamels are used not only for actual camouflage but also for suppressing the glint of metal and the gleam of polished surfaces.

3. **Earmarking equipment.** Color is widely used for identifying the different types of shells, bombs, and other material.

Industrial finishing manufacturers have been called upon to supply large quantities of finishes of various types for these and other defense purposes, and there is every reason to believe that the national defense demands for 1941 will be much greater.

Leaders of the industry have also been of assistance to the government in helping to modernize the finishing specifications for material. Many products now needed in large quantities have not been manufactured for a period of years, and, as a result, their finishing specifications are obsolete. Through the cooperation of the industrial finishing industry, these specifications are being brought up to date.

The use of modern "high-speed" finishes that dry very rapidly is very important because it shortens production schedules and permits full use of modern high-speed mass-production methods. Wrinkle finishes, which were developed since the last war, should also be used widely on military equipment, because these finishes can be applied in a single coat on roughly finished metal surfaces, form tough,

durable coatings, and do not reflect the light. Now specifications will permit the use of these finishes.

Besides furnishing finishing materials, it is highly probable that industrial finishing manufacturers will also be called upon to do other kinds of work for the government because of their wide experience in a highly specialized field of organic chemistry.

Developments During 1940

Infra-red Baking. The use of the infra-red baking process, in which the heat radiated by electric lamps is employed, spread rapidly during the year. The advantages and limitations of this process are now well understood. It is especially useful in mass-production work where pieces of the same shape and size are being turned out. After considerable experimenting infra-red baking has been found to be a most useful addition to the facilities for industrial finishing.

Special Finishes for Infra-red Baking. While many of the older types of finishes can be baked by the infra-red process, better results are obtained by using finishes developed especially for the use of this process. During the year, several lines of special "infra-red" enamels were developed. The chief feature of these new finishes is that they cure very rapidly under the impact of the infra-red rays.

A New White Enamel. Improvements in white enamels have been made regularly for years past and the year 1940 was no exception. During this year a white enamel was developed that has excellent color retention under high heat and is resistant

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to hot oil, grease, etc. Its special field of usefulness is on stoves.

Hot Lacquer. Though the principle of applying lacquer of high viscosity when hot is sound, progress in the use of this material was slow during the past year. Technical considerations are still holding up its general application.

Automatic Finishing. Mechanical methods of handling products to be finished, of applying the finishes, and of distributing the finishing materials continue to increase in use. They are, of course, suitable only where products of a single kind are being produced in considerable quantities, but their use is not necessarily limited to very large operations.

Modern Plastics 1941 Catalog. The 1941 Modern Plastics Catalog is now being issued by Breskin Publishing Corporation, 122 E. 42nd St., New York City. Containing over 476 pages, the catalog is profusely illustrated and organized to make the finding of specific information an easy task. This is the first time that the book has been published in its present form.

There are nine main divisions: Plastics Engineering, which is introduced for the first time and contains flow sheets that show at a glance the manufacturing procedure involved in producing various plastic materials.

The Materials section consists of a series of comprehensive articles treating all types of plastics according to their composition. Each of these stories is a treatise in itself, written by an expert and covering all new developments and applications during the last year. The subjects of Fillers and Coloring Materials are treated in this section.

Under the heading, Machinery and Equipment, readers will find a complete coverage of new developments in all types of molding presses, extruding machines, assembly devices, and molding plant equipment.

The section on Laminates begins with a flow sheet showing manufacturing processes and continues with discussions on such points as filler for laminates; decorative and industrial laminates, and resin-bonded plywood.

Plastic Coatings have become so increasingly important that, this year for the first time, a complete section of the catalog is devoted to them. A compilation of authentic data on Synthetic Fibers also makes its debut this year. Nylon, Vinyon, Protein fibers, cellulose acetate viscose rayons are fully covered.

The valuable Plastics Properties Chart appears again, completely revised, where required through improvement or change in the raw material involved. This Chart has become a standard reference in the plastics industry and the fact that constant revisions are made to keep it accurate and up-to-date, makes it all the more important.

There are two other charts appearing this year: One on Solvents, the other on Plasticizers. With plastics finding ever wide uses, the interest in solvents has become more universal. The functions of solvents are many: The raw materials manufacturers are interested in them because they are vital in processing their materials; the molders and fabricators are interested because solvents are essential in various assembly operations as bonding and adhesive agents. Solvents are frequently employed in polishing and finishing processes. Although the range of solvents is extremely wide, the Chart shows at a quick glance the mean and extreme limits of various types.

The Directory Section of the 1941 Modern Plastics Catalog is considerably larger than that of any previous catalog. It contains the most complete list of custom molders — compression and injection — ever compiled, as well as a list of foreign manufacturers of plastics in Canada, South America, and Mexico. The latter is a new feature as is the list of technical, design, and vocational schools in the United States that give courses in plastics. The Selected Bibliography of books and magazines on plastics has been brought up to date, as has the chapter devoted to the Nomenclature common to the industry. Complete listings with names and addresses of those companies engaged in various phases of the plastics industry are also included, along with a section on molders' markings. There is also a directory of trade names.

The 1941 Modern Plastics Catalog is the most complete work of its kind ever published. Copies are available at $3.50 each.

Drying, Baking, Heating with Westinghouse Radiant Heat Drying Lamps. A 12-page catalog describing drying, baking and heating applications by means of Westinghouse Radiant Heat Drying Lamps is now being issued by Westinghouse Electric & Manufacturing Co., Lamp Division, East Pittsburgh, Pa. Among the items discussed in this catalog are: Low initial investment costs, speed and economy, ease of control, flexibility, convenience, adaptability, and compactness. Several pages of typical installations of radiant heat drying lamps are included.

A copy of this catalog will be sent free upon request.

Technical and Scientific Books. The Fall 1940 catalog of important Technical and Scientific Books of the Chemical Publishing Co., Inc., 148 Lafayette St., New York City, contains many important new titles. Books of importance in all technical and scientific fields have been added to the previous standard and authoritative works.

A glance through this new catalog reveals books of interest to the layman, chemist, engineer, metallurgist, technician, scientist, and so on.

The convenient check list printed on the outside cover will insure that the catalog is passed on to those who are interested in new products, new methods, and new uses. Copy free upon request.

"What's New in Industrial Finishing." A 12-page magazine covering the developments in the product finishing field has been launched by The Sherwin-Williams Company, 101 Prospect Ave., N. W., Cleveland, Ohio. This magazine is designed primarily for the consumer of industrial finishes. It will cover developments in the field and will endeavor to tell of Sherwin-Williams' contributions to industrial finishing technique.

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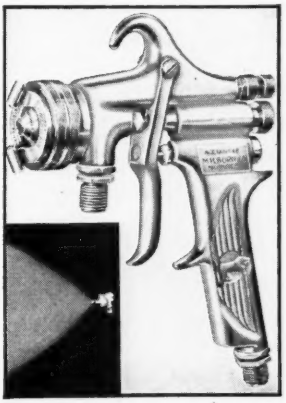

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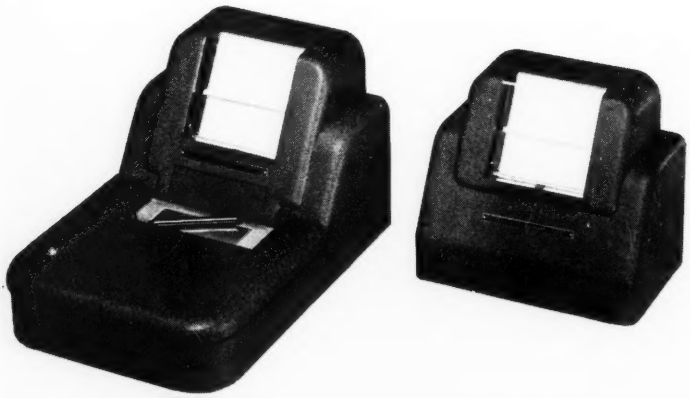
(Right—This modernized, streamlined fire extinguisher is constructed of amber glass and is smartly set-off with a neatly tapered brushed brass metal cap.

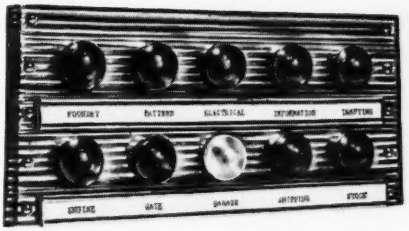
(Photo Courtesy Designers for Industry)

(Below)—The compactly designed telescriber shown here is enclosed in a black "crackle" enamel finished case.

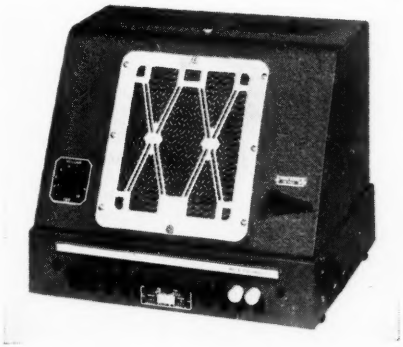
(Photo Courtesy TelAutograph Corporation)



(Right)—Standardized mounting strips such as the set illustrated herewith are finished with bright plated finishes.



(Photo Courtesy The H. R. Kirkland Co.)



(Photo Courtesy Operadio Manufacturing Co.)

(Left)—The fine finishes available on Operadio Inter-Commu Paging Units consist of one coat of Zapon Brevolite gray wrinkle enamel which is baked at 225 deg. F. until the wrinkle is fully formed.

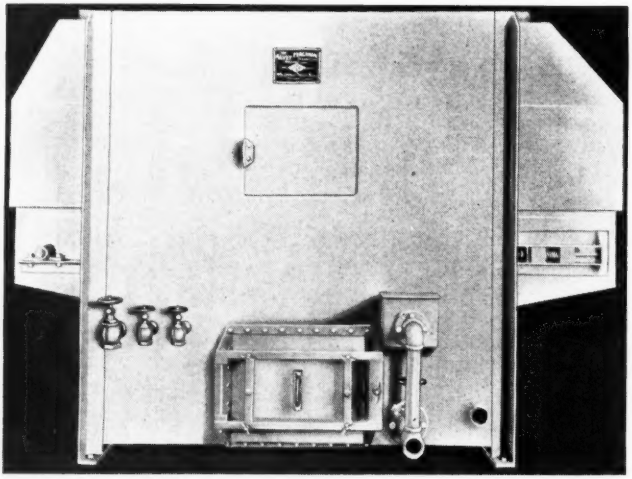
(Right) — The handsome aluminum case of this "pocket size" radio is attractively plated to enhance the appearance and to provide a durable finish.

(Photo Courtesy Crosley Corporation)

. . . the 1940 Finis

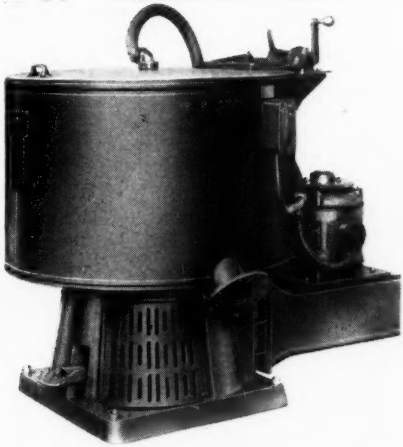
To provide a quick and easy reference to many of the important equipment and material developments which were placed on the market during the past year, this review section is divided into four brief parts under the headings Cleaning, Plating, Polishing and Finishing.

CLEANING

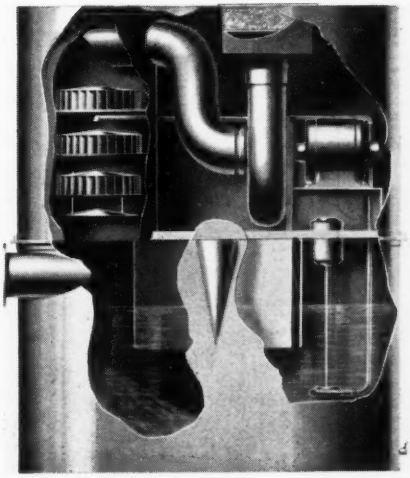


(Left)—The Alvey-Ferguson Company, 200 Disney St., Cincinnati, Ohio, placed on the market a metal parts washing machine to be known as the "A-F." A multitude of various size and shape parts and products can be spotlessly cleaned with the A-F washing machine which also can be designed to meet special requirements.

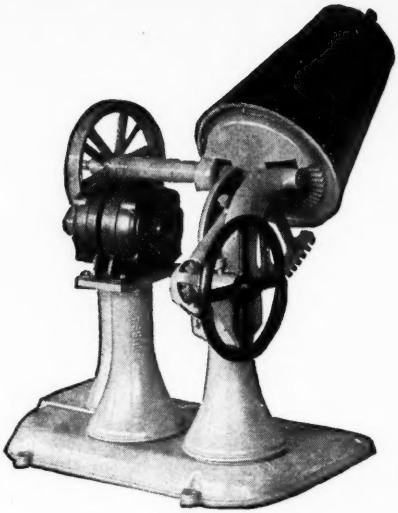
inishing Review - - -



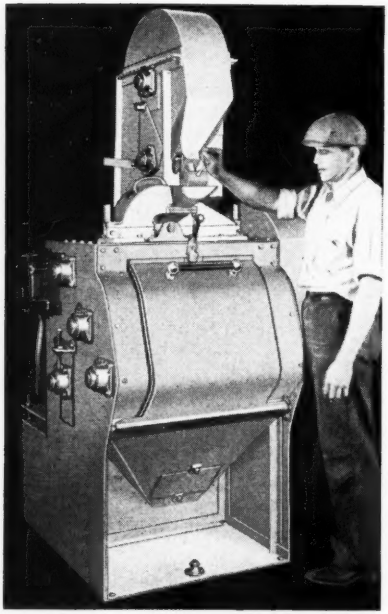
(Left) — A centrifugal machine which washes, rinses and dries small metal parts, designated as the Centriforce Washer, was placed on the market by Tolhurst Centrifugal Division, American Machine and Metals, Inc., East Moline, Ill. This unit is designed for use in finishing departments and plating plants.



(Right)—The Claude B. Schneible Company, 3951 W. Lawrence Ave., Chicago, Ill., placed on the market a portable type wet method dust collector to be known as the "Schneible Midget Multi-Wash Dust Collector." The Schneible Midget has been designed for the collection and disposition of dust and fumes arising from isolated operations on machines or equipment that cannot be economically tied into a central dust collecting system.



(Right)—A tilting tumbling barrel equipped with an industrial motor drive for tumbling metal parts was placed on the market by The Globe Machine & Stamping Company. 1250 W. 76th St., Cleveland, Ohio. This unit is said to be equipped with a work-shifting bottom that "kicks" the load forward, upward, back, and down. Another feature of the Globe Tilting Tumbling Barrel is an agitator strip arrangement which is said to further help keep the load in motion.

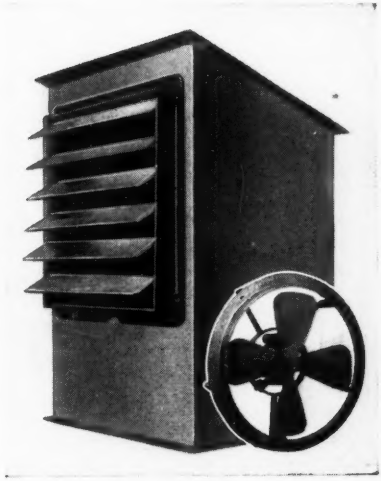


(Left)—A 15 in. x 20 in. airless Wheelabrator Tum-Blast, having an operating load capacity of one cubic foot, was placed on the market by American Foundry Equipment Co., 555 S. Byrkit St., Mishawaka, Ind. This Tum-Blast performs its cleaning function without compressed air by using a Wheelabrator centrifugal abrasive blasting unit which throws metallic abrasive, under perfect control, upon the work being cleaned or prepared.

(Right)—The Truflo Fan Co., 536 Main St., Harmony, Pa., announced two series of wall fans of aluminum alloy construction ranging in diameters from 12 to 36 in. and from 42 to 48 in. and employing four and six-blade propellers respectively.

(Left) — Wire wheel brushes designated as "Whirlwind" were placed on the market by Van Dorn Electric Tools, Towson, Md. "Whirlwind" wire wheel brushes are available in sizes, thickness, and wire gages to accommodate practically any wire brushing application.

(Right)—The Truflo Fan Company, 579 Main St., Harmony, Pa., announced a complete line of Pent House Fans for venting obnoxious gases, fumes, and dusts. The pent houses are of sturdy steel construction and are available in a complete range of sizes for housing standard Truflo wall fans of 12 in. to 48 in. diameters.



AIRWAY *Ventilated* BUFFS

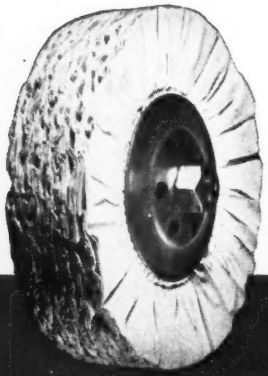
To the Executive.

To the Purchasing Agent.

To the Polishing Room Superintendent.

Gentlemen:

It may be you don't even know what we are talking about because you have never used AIRWAY VENTILATED BUFFS, but that's no excuse. If you buy AIRWAY VENTILATED BUFFS then you will know what we are talking about when we say we will save you 50% on your cotton buff wheel costs.



JACKSON BUFF CORPORATION

L. W. MacFarland

President.

JACKSON BUFF CO

21-03 41st AVENUE

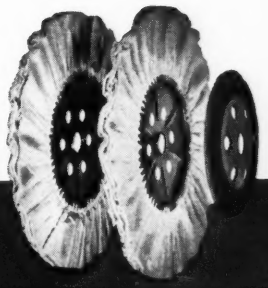
FS AIRWAY *Ventilated* BUFFS

We claim 50c on the dollar saving. We don't care whether it is $1,000.00 or $10,000.00. You can't with safety challenge that statement. We can with safety make it.

Warning Notice

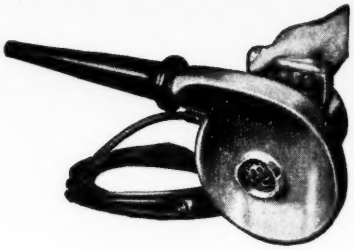
Jackson Buff Corporation of Long Island City, New York, has rights to U. S. Patents Nos. Re 19,894 and 2,140,208 which have broad claims covering an air-cooled buff having means for the admission of air through the sides of the buff.

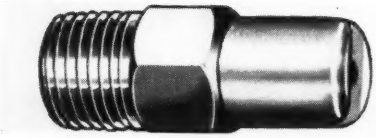
Owner intends to protect all rights and stop infringement.



F CORPORATION
LONG ISLAND CITY, N. Y.

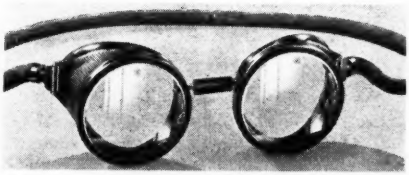
(Right)—The line of portable hand-type and portable tank-type industrial cleaners manufactured by the Ideal Commutator Dresser Co., 1031 Park Ave., Sycamore, Ill., was furnished with new improvements which included a three-wire ground cable and protective mesh wire screening of motor commutator housing.

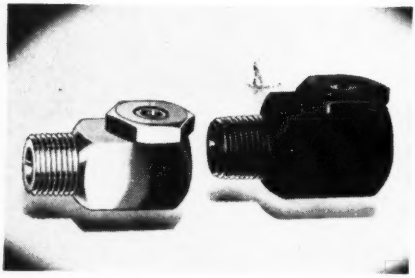




(Left)—The illustration herewith shows a flat spray nozzle designated as the Type "U," which was placed on the market by Spraying Systems Co., 4021 W. Lake St., Chicago, Ill. The spray obtained by this type of nozzle is of the flat type with a slightly heavy center.

(Right) — American Optical Company, Southbridge, Mass., placed on the market a No. 303 Super Duralite-50 Safety Goggles with a non-rubber headband. The eyecups are molded from a special material that is said to combine light weight for comfort with high tensile strength for long wear.





(Left)—The illustration herewith shows a "Whirljet" non-clogging spray nozzle which was placed on the market by Spraying Systems Co., 4015-21 W. Lake St., Chicago, Ill. This nozzle is available in brass, iron, hardened steel, stainless steel, monel metal, lead, and hard rubber.

Cowles MC Metal Cleaner

The Metal Cleaner Department of the Cowles Detergent Company, 7016 Euclid Ave., Cleveland, Ohio, announced the addition to Cowles MC Cleaner to its line. MC Cleaner is a medium pH material of unique anionic balance, containing an effective detergent accelerator. Cowles MC Cleaner is suitable for still tank work and highly recommended for cathodic cleaning of steel, brass, and copper. MC Cleaner is readily soluble, cleans fast, and rinses rapidly. It is economical to use because it is technically anhydrous in composition, thus chemically clean metal can be obtained by using low concentrations.

Oakite Oxbrite Process

Having been successfully used under actual production requirements in a number of plants and clearly evidenced its outstanding advantages and economies, an improved method for the electro-cleaning of buffed brass, bronze and other copper alloys was announced by Oakite Products, Inc., New York, N. Y. Data on it is now being released to the trade through its nationwide organization of Service Representatives. The method should be of interest to executives in charge of plating departments where either bright nickel, chrome, cadmium or other plated finishes are applied to brass, bronze and other copper alloys.

Metso 88 Special

A special alkaline silicate cleaner for aluminum, tin, and alloys of either has been announced by the Philadelphia Quartz Company, Philadelphia, as the newest member of their line of Metso Cleaners.

It is reported that the ingredients of the new cleaner, called "Metso 88 Special," permit effective use in either hot or cold, hard or softened water. The cleaner is a free rinser.

The cleaner quickly removes animal, vegetable, or mineral oils, as well as solid dirt, from sensitive metal surfaces and at the same time provides a maximum margin of safety.

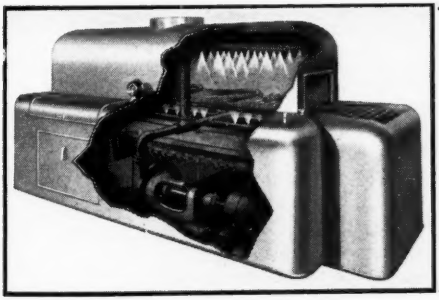
Industro Aluminum Cleaner A-6

An aluminum cleaner to be known as "Industro Aluminum Cleaner A-6" has been placed on the market by Industrial Chemical Products Co., 3777 Bellevue Ave., Detroit, Mich. According to the manufacturer, this material can be used for removing oil and grease from aluminum surfaces without tarnishing or etching the surface.

Galvaprep

A solution to be known as "Galvaprep," which is designed to properly treat and prepare various zinc surfaces so that the best and most enduring adhesion can be obtained between the zinc surfaces and the paint finishes, has been placed on the market by Neilson Chemical Co., 6564 Benson St., Detroit, Michigan.

Galvaprep is said to convert the ordinarily oily, greasy appearing surface of zinc into a hard, inert paint receptive base. The etching action of Galvaprep insures an ideal base to which



HYDRO-FLOW
Industrial Washing Machines

Streamlined design. Hidden motors, pumps and pipes are easily assembled. Piping and nozzles located to insure thorough cleansing of all surfaces. Rugged and efficient pressure pump. Corrosion resistant spray nozzles — from mist to open stream. Monorail, Belt or Gravity type conveyors designed to carry any shape or size material. Variable speeds on conveyor drive synchronize production.

Write for circular.

International Conveyor & Washer Corp.
640 E. FORT ST. DETROIT, MICH.

both the coating and paint will bond firmly. This material is said to remove and neutralize all corrosive agents that are harmful or detrimental to the paint and which eventually contribute to the general breakdown of the finish.

Macdermid Dyclene Process

The Dyclene Process, designed primarily to produce a chemically and metallurgically clean surface on zinc base die castings prior to any plating operation is now being marketed by Macdermid Incorporated, Waterbury, Connecticut. The process can be used following solvent degreasing or metal parts washing. It can be used electrolytically at low concentrations with reverse current.

Where it is desirable to eliminate degreasing equipment, hand operations, or metal parts washing machine, the Dyclene "S" or soaking operation is suggested. This is run at, not in excess of, 6 ounces per gallon. Neither of the Dyclene products decompose chemically and need only to be replenished in accordance with the loss by drag-out.

The Dyclene Process, used at the concentration suggested electrolytically, will not cause any attack on the surface or the formation of oxide.

Enthone Acid Addition Agent

A liquid wetting and penetrating agent which may be added to sulfuric or hydrochloric acid metal pickles to reduce their surface tension has been placed on the market by The Enthone Company, 442 Elm St., New Haven. Connecticut.

Enthone Acid Addition Agent is stable in hot sulfuric acid solutions up to 15 per cent acid concentration and in cold sulfuric or hydrochloric acid up to 1 to 1 concentration. This addition agent can be used for acid dips or pickles made of sulfuric or hydrochloric acid for removal of rust or scale from iron or steel and for removing oxide from non-ferrous metals such as copper or its alloys.

Solvents Recovery

A solvent recovery service has been made available through Solvents Recovery Service, Inc., Lister Ave., Newark, N. J. The process employed was perfected by Mr. Lewis Lofgren, and is known as the Lofgren Process.

The Lofgren Process involves an analysis of each customer's contaminated thinners to determine the proper treatment. Distillations are made and sometimes intermediate treatments are included which do not affect the original composition of the thinner. The system is said to be flexible enough so that as little as 200 gallons of contaminated solvent, as well as a car load, can be treated economically.

Pynosol NuSteel

A cleaning material to be known as "NuSteel" for removing heat tint, cleaning, polishing, and finishing stainless steel and Monel has been placed on the market by Pynosol Laboratories, Inc., 215 N. Aberdeen St., Chicago, Ill. NuSteel cleaners can be used in conjunction with power application; that is, with special tampico wheel brushes and slow speed portable polishing machines.

Two types of NuSteel cleaners are adaptable to power application, namely, NuSteel Paste and NuSteel Liquid No. 9, Type 5060. Both products are said to be identical in composition, one being a paste and the other in liquid form so that it may be applied manually or with a spray gun.

Metastrip

A stripping material, to be known as "Metastrip," for stripping baked enamels, varnishes, lacquers, paints, japan, any synthetic finishes from metals such as steel, zinc, and so on, has been placed on the market by Estox Products Company, Westville P. O. Box 2954 No. 18, New Haven, Connecticut.

Metastrip is an opaque liquid which is said to contain no caustics and depends on emulsifying agents for its action. Metastrip is maintained at a temperature of about 190 to 200 deg. F. Work to be stripped is immersed in the solution and after immersion, must be removed and rinsed in hot water.

This material is available in five-gallon cans, 30-gallon drums, and 54-gallon drums.

Metal Working and Finishing Performance Data. A 48-page bulletin for the metal working and finishing industry is now being issued by Magnus Chemical Company, Inc., 10 South Ave., Garwood, N. J., manufacturers of industrial cleaning materials and metal working lubricants. The bulletin consists of a series of detailed performance reports from metal working plants of all kind, outlining improvements and economies effected by the use of properly selected cleaning materials in comparison with formerly used materials and methods.

For convenience, these reports are arranged in a number of classifications, each involving a particular metal cleaning and finishing operation.

The reports are full of usable and practical ideas that will help you save money, speed production and meet rigid quality specifications.

Copy free upon request.

Electro-Matic Self Cleaning Air Filter Model "C." Bulletin No. 250-C covering the improved Model "C" Electro-Matic Air Filter, product of the American Air Filter Co., Inc., 696 Central Ave., Louisville, Ky., has been released by this firm. Consisting of 16 pages, the bulletin describes and illustrates the construction and operation of the Model "C" filter in terms that can be understood by either the engineer or layman. Diagrams and cut-away sections show how electrical precipitation and automatic air filtration have been combined in a compact self-contained unit, requiring no outside electrical connections other than an ordinary 110-volt a.c. lighting circuit.

Copy of Bulletin No. 250-C free upon request.

Rolock Wire Mesh Baskets for Industrial Use. A 12-page catalog describing and illustrating Rolock wire mesh baskets is now being issued by Rolock Incorporated, Railroad Place, Southport, Conn. Rolock baskets and crates are made for such varied industrial uses as dipping, pickling, degreasing, drying, plating, galvanizing, centrifugal working, and toting. Some of the many types which are manufactured by this company are shown in this catalog.

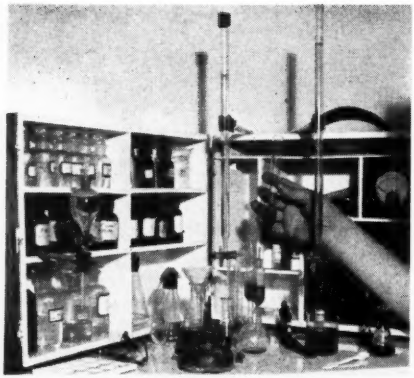
Every basket is made to order and not one is a stock item. Each is built to fit the customer's particular requirements, thus giving complete satisfaction with maximum life at an economical cost per hour of use. Experience in this field enables this company to help you with intelligent and practical suggestions. Correct design is based on the choice of the proper metal or alloy, type of construction, shape and size of basket, type of handle, size and weight of mesh, number and location of braces, and so on.

A copy of this catalog will be sent free upon request.

Good Cleaners for Good Plating. Bulletin No. C-104 describing a complete line of cleaners for removing greases, oils, polishing and buffing residues, and so on, from metal surfaces of all types, preparatory to plating and finishing, is now being issued by Hanson - Van Winkle - Munning Company, Matawan, N. J. The bulletin covers eight different cleaners and three soaps.

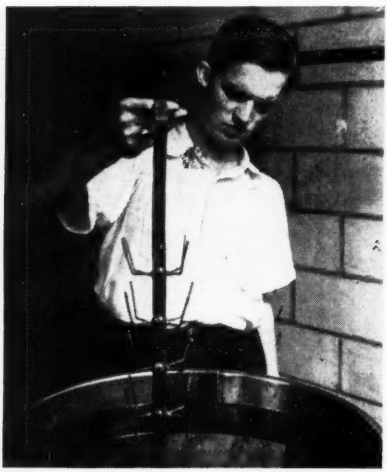
A copy of this catalog will be sent free upon request.

PLATING

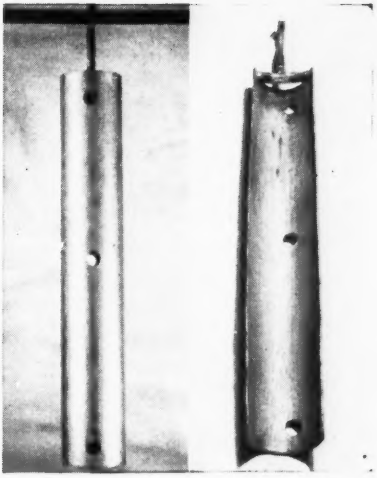


(Left)—The portable chemical laboratory shown in the accompanying illustration was designed for application of accurate chemical analysis on a small scale to the field of electroplating by Joseph B. Kushner, 126 W. 32nd St., New York City.

(Right)—A new type of insulating steam joint was developed by the Hanson-Van Winkle-Munning Company, Matawan, N. J., manufacturers of electroplating equipment and supplies.

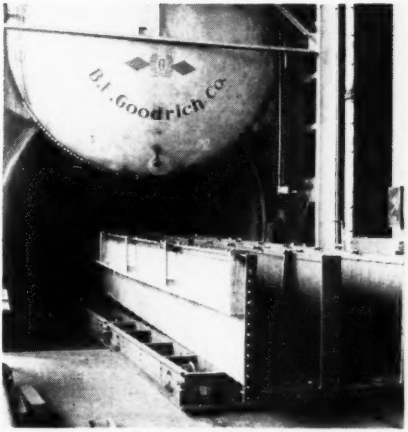


(Left)—The Michigan Chrome Company, 6346 E. Jefferson Ave., Detroit, Mich., introduced a protective coating material to be used for insulating plating racks. This coating, known as "Miccrolite," can be applied and will air dry quickly. This material has been developed as an all-purpose protective material for plating racks used in any solution or acid or in any process.

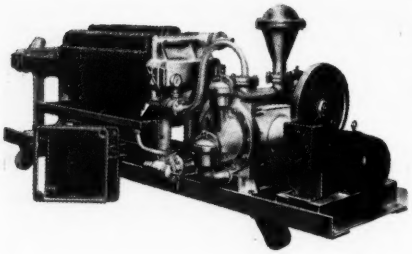


(Right)—A tubular lead anode designed to give unusually even throwing power and low resistance for the current discharge surface available was marketed by Acme Lead-Burning Company, 3726 West 73rd St., Cleveland, Ohio. The Acme Tubular Anode is available in either pure lead or 6 per cent antimonial, according to specifications.

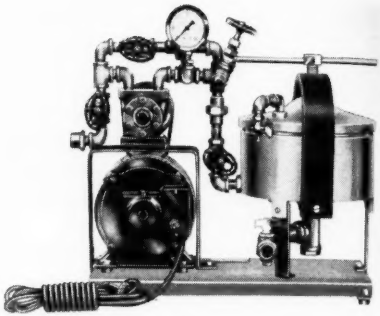
(Left)—A source of power for electroplating, to be known as the "Selectro-Plater," was placed on the market by The W. Green Electric Co., Inc., 192 Broadway, New York, N. Y. This unit will deliver 7½ volts at 4 amperes on continuous load and will give over 8 amperes on intermittent load or flash plating. This unit operates on alternating current only, at line voltages of 105, 110, and 125 volts.



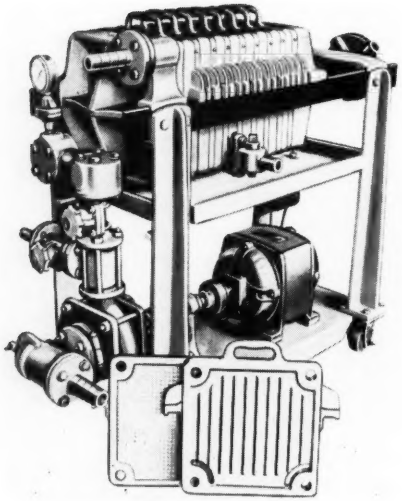
(Right)—A tank lining designed especially for bright nickel plating tanks to be known as Triflex "K" was placed on the market by The B. F. Goodrich Co., Akron, Ohio. Triflex "K" Lining is applied to steel tanks by means of the Goodrich Vulcalock process. By means of this process, a firm bond, even at elevated temperatures, is assured. The application of Triflex "K" Rubber Lining Material can be made either at the factory or in the plant.



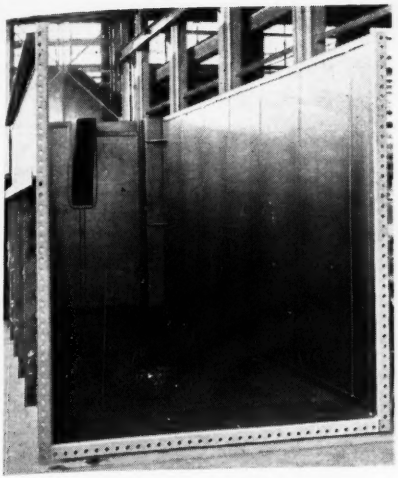
(Left)—A plate and frame pressure filter for filtering plating solutions was placed on the market by T. Shriver & Company, 808 Hamilton St., Harrison, N. J. The design of the filter and the corrosion resistant construction of all parts exposed to contact with the fluid being handled are said to provide versatility of application.



(Right)—The development of a compact, versatile laboratory filter of the horizontal-plate type was announced by the Sparkler Manufacturing Company, Chicago, Ill.



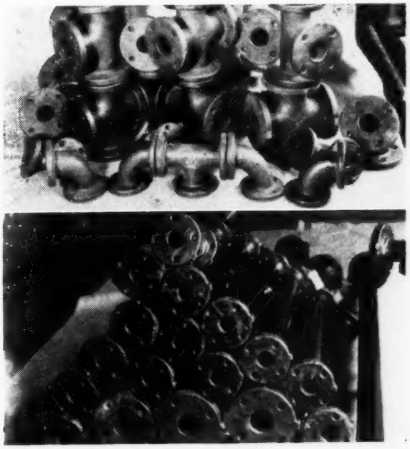
(Left)—A new filter press, developed for the purpose of reducing the amount of time and labor required to remove the filter cake after filtration has ceased, was placed on the market by T. Shriver & Company, 850 Hamilton St., Harrison, N. J.



(Left)—A rubber tank lining material to be known as Triflex "K" was developed for bright nickel plating and for high speed bright copper solutions by The B. F. Goodrich Company, Akron, Ohio. Triflex "K" is a special adaptation of a patented three-ply lining construction developed by the Goodrich company in response to demands for a durable lining for heavy duty pickling tanks in the steel industry.

(Right) — Edwin L. Wiegand Company, 7500 Thomas Blvd., Pittsburgh, Pa., announced a new Chromalox Immersion Heater to be known as the Type MF.

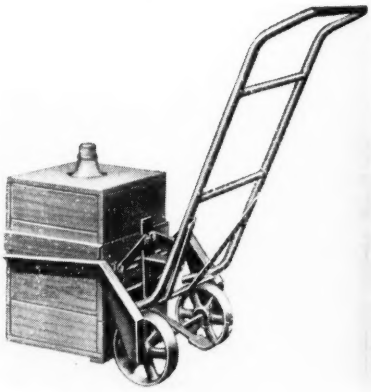
(Right)—The accompanying illustration shows examples of rubber-insulated pipe and fittings that were placed on the market by Paramount Rubber Service, Inc., 1430 Rosedale Court, Detroit, Mich. The pipe and fittings are designed for application wherever corrosive chemicals are used.



(Left)—Two types of immersion heaters designed specifically for heating alkaline cleaning solutions were placed on the market by Westinghouse Electric & Manufacturing Co., Mansfield, Ohio.

(Left)—A portable brush electroplating unit for plating silver was announced by Rapid Electroplating Process, Inc., 1414 S. Wabash Ave., Chicago, Ill. A plating compound which enables the unit to plate 0.0002 to 0.001 inch thickness is also available.

(Right)—Designed to facilitate the handling of acids and caustics, the carboy truck shown in the illustration was brought out by the Barrett-Cravens Co., 3255 W. 30th St., Chicago, Ill. The truck is provided with two arms which can be spread apart by means of pressure on a readily accessible foot pedal and which are closed against the crate housing the carboy when the pedal is released.



Bright Copper Solution

A process for obtaining bright copper deposits is described in U. S. Patent No. 2,195,454. This patent is based on an application by Lawrence Greenspan assigned to Louis Weisberg, Inc., 71 West 45th St., New York City. The solution used is not of the familiar acid sulphate or cyanide type generally used for copper plating. Instead, the copper is present in the form of a complex salt formed by interaction of copper sulphate with a suitable amine; certain agents are employed in addition to give brightness and for other purposes.

Various commercially available amines may be used. An example given in the patent is diethylene triamine. The invention is based on the discovery that good, ductile, bright copper deposits can be obtained from solutions containing complex copper salts formed by interaction with amines, for example, diethylene triamine, providing the solution also contains suitable amounts of ammonium compounds such as ammonia and/or ammonium salts. In general, therefore, the solution may be said to contain copper sulphate, diethylene triamine, and ammonium sulphate, with or without some additional ammonia.

Cuprodine

A dip solution for copper-coating steel without current to be known as "Cuprodine" has been placed on the market by American Chemical Paint Company, Box 303, Ambler, Pa. "Cuprodine" can be used on wire and strip, for masking surfaces before carburizing, and with some success, as a basis for nickel plating.

Cuprodine is a powered chemical that can be used in the same manner as ordinary copper salts, and is said to produce a dense, adherent, lustrous coating.

The solution consists normally of 3 per cent of 60 deg. or 66 deg. Be. sulphuric acid by volume in water, to which three ounces of Cuprodine have been added for each gallon of solution. The Cuprodine should be added to the acid-and-water mixture after it has reached a temperature of 150 deg. F. This speeds the dissolution of the Cuprodine. With certain types of steel, the solution may run as low as 2 per cent in acid.

Stripode

An addition agent for speeding up the stripping of nickel deposits and protecting the base metal to known as "Stripode" has been placed on the market by The Chemical Corp., 93 Broad St., Springfield, Mass., "Stripode," when added to sulphuric acid strip of any concentration, is said to speed up the removal of the nickel plate, and protect the base metal from pitting, roughening, and etching. According to the manufacturer, less acid is consumed, the work is stripped in a minimum of time, and pitting and roughening of the base metal is prevented when "Stripode" is used.

Stripode can be added to the sulphuric strip at a concentration of ¼ to ½ oz. per gallon. The addition of Stripode causes foaming at first, but is said to decrease after a day's operation.

For stripping nickel from steel and zinc die castings, 60 per cent sulphuric can be used satisfactorily. For stripping nickel from brass, a strength of 70 per cent acid is recommended if the

UNIFORM ELECTRODEPOSITS

Use Harshaw Anodes and Chemicals for uniform plating of Nickel, Copper, Chromium, Cadmium, Tin, Zinc and other kinds of plating.

THE HARSHAW CHEMICAL CO.

Manufacturers, Importers, Merchants.

Offices and Laboratories: Cleveland, Ohio.

Branch offices in principal cities.

nickel deposit is more than 0.0004; otherwise 60 per cent acid may be used. Six to twelve volts and at least fifty amperes per square foot are required for effective operations of the stripping solution.

Trojan Nickel Dip Wetting Agent

A surface active material to be known as "Trojan Nickel Dip Wetting Agent" has been placed on the market by Trojan Products & Manufacturing Co., 3130-36 S. Wabash Ave., Chicago, Ill. This material has been formulated for specific use with the standard nickel dips that are in use in many enamel plants.

Trojan Nickel Dip Wetting Agent is recommended for use in high production systems and where quality and adherence of a nickel coating is desired. Trojan Nickel Dip Wetting Agent provides the means for obtaining a refined grain structure of the nickel coating and thus a better bond to the base metal. Deposition is said to be more rapid and uniform owing to the increased wetting power of the bath. The high wetting power further enables the more uniform deposition in recessed areas and seams.

The Trojan Nickel Dip Wetting Agent is said to be a powerful surface tension depressant. A 0.12 per cent solution of Nickel Dip Wetting Agent (one lb. per 100 gallons) is recommended for use in conjunction with any standard formula of nickel dip. According to the marketers, the solution yields identical results in both automatic and batch cleaning-pickling systems regardless of the cycle.

Filter Press Paper

The Enthone Co., 442 Elm St., New Haven, Conn., has announced the sale of a new high strength paper for filter presses, which is claimed to possess maximum wet strength. The paper is said to have exceptionally long fibres, and in addition has been given a patented wet strength treatment.

The paper, costing less than a cent a sheet, is placed against the filtering canvas or screen and the filter cake deposits upon the paper, thus enabling rapid cleaning of the canvas by merely removing the filter paper and carrying away the filter cake.

It is stated that the high strength of the paper, both wet and dry, obviates any danger in tearing, both in placing the paper and removing it from the canvas. The paper, being only a few mils thick, allows tight locking of the plates and frames to prevent leakage.

The paper is fast filtering, and tests by the supplier have shown it to possess high strength in acid solutions with pH values as low as 2.0 and in strong caustic solutions up to 15 oz. per gallon of caustic soda.

Miccrolac

A new coating material, known as Miccrolac, to be used to protect and beautify metal surfaces of either natural or plated finishes, has been introduced by the Michigan Chrome Company, 6340 East Jefferson Ave., Detroit.

One of the outstanding characteristics of this new material is its color, which approximates that of distilled water. In addition, it dries to a high lustre, and offers excellent qualities of adhesion flexibility and abrasion resistance. It dries exceptionally fast — the type of coat applied for ordinary decorative work drying in only a few seconds' time.

Miccrolac provides excellent resistance to sulphur dioxide, sunlight, moisture (preventing rust), oil, grease, gasoline, and all commonly known chemical fumes. It does not blush even in the most humid weather.

Acheson Coating for Immersion Heaters

"Furring" of electrical immersion heaters may now be prevented or minimized as the result of the development of new coating on which a patent has been granted to Acheson Colloids Corportation, Port Huron, Michigan.

The treatment is exceedingly simple, consisting merely of dipping, spraying or brushing the parts in or with a coating that hardens on exposure to light. The coating itself consists of a water suspension of colloidal graphite, a hardenable organic colloid and a hardening agent.

The coating is said to improve heat conductivity, and to possess a relatively high degree of resistance to abrasion.

Filtomesh

A specially designed rubber "cushion" for use between the filtering plate and the filtering medium to be known as "Filtomesh" has been placed on the market by Paramount Rubber Service Inc., 1430 Rosedale Ct., Detroit, Mich. "Filtomesh" is said to be applicable to all types of filters in which the filter medium is backed by a channeled or perforated plate or disc. It is corrosive resistant, but is not recommended for use where concentrated acids or elevated temperatures are encountered.

Filtomesh is said to maintain a normal rate of flow over greatly extended periods of solution use and improves the clarity of solution, thus resulting in smoother and finer plated finishes.

H-V W-M Insulating Joints for Electrochemical Pipe Lines

Insulating joints which are recommended for cleaning tanks, plating tanks, and heating and cooling lines have been placed on the market by Hanson-Van Winkle-Munning Co., Matawan, N. J. Plants employing electrochemical processes such as electroplating, electrotyping or electrorefining will find these joints particularly valuable where there is a possibility of electrical currents through the pipe lines used to transfer solutions.

The insulating joints, being of simple construction, are made of malleable iron and include compressed fibre insulating rings which encircle a ball member at two different places. They are tested for 125 volts direct current service and for 200 lbs. per sq. in. steam pressure. According to the manufacturer, these insulating joints may be safely used under hydraulic pressures as high as 1,000 lbs., depending upon the size of the joint.

"Cadalyte." This is the title of a technical service manual describing "Cadalyte" salt for cadmium plating which is now being marketed by the R. & H. Chemicals Department of E. I. du Pont de Nemours & Company, Inc., Wilmington, Del. This manual contains full data for operations and maintenance of plating solutions, with cost and time tables on commercial deposits. Tests for deposit thickness are suggested, with notations describing equipment required. Control and methods of analysis are also covered.

Cadalyte is specifically designed to simplify the plating of cadmium metal, the manual points out. When used in the prescribed process, any type of cadium plating can be produced economically over a wide range of operating conditions, it is explained. High strength solutions are recommended for high production rates and more dilute solutions for low-cost plating.

Automatic Temperature Control in Electroplating Processes. A fully illustrated folder describing automatic temperature control instruments for electroplating processes is now being issued by the Foxboro Company, Foxboro, Mass. The Foxboro Duplex automatic temperature control instrument described in this bulletin combines within one case two separate and complete control mechanisms.

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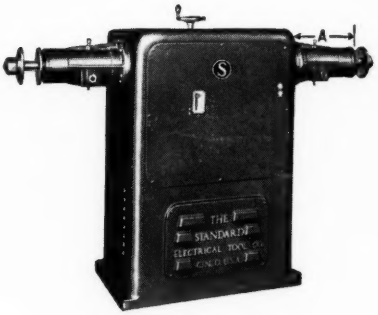
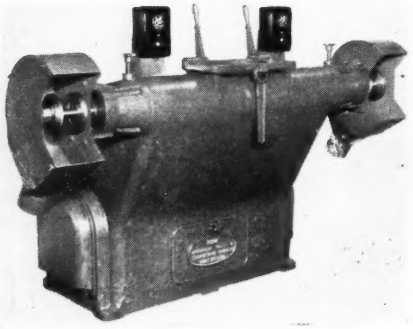
POLISHING

(Left)—A variable speed Polishing and Buffing Lathe to be known as the Model "VRO" was added to the Hammond of Kalamazoo line of polishing and buffing lathes manufactured by Hammond Machinery Builders, Inc., 1622 Douglas Ave., Kalamazoo, Michigan.

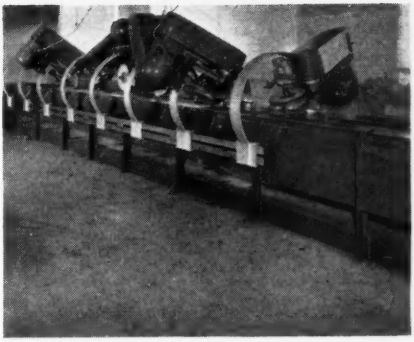


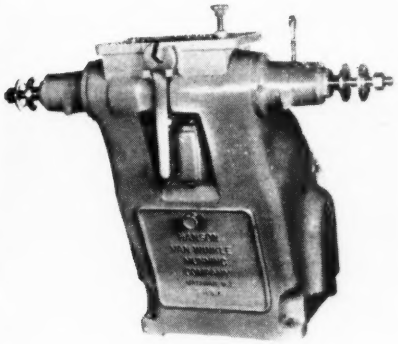
(Right) — The Standard Electrical Tool Company, 1941 W. Eighth Street, Cincinnati, Ohio, developed an infinitely variable speed buffing and polishing machine designed to serve all requirements of buffing, polishing, coloring, and so on.



(Left)—Rome Machinery Sales & Engineering Co., 627 Webster St., Rome, N. Y., placed on the market a polishing and buffing lathe known as the Model "2MIS." This model, complete with dust hoods and wheel guards, is shown in the accompanying illustration.

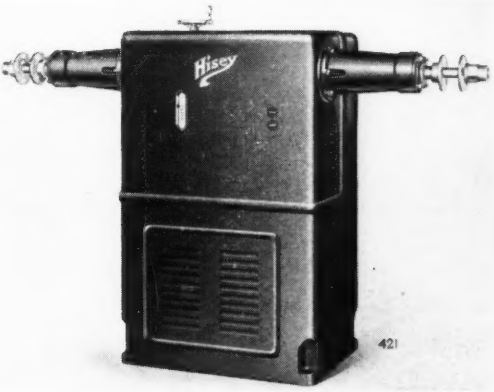
(Right)—The Udylite Corporation, 1651 E. Grand Blvd., Detroit, Mich., announced the development of a straight full automatic polishing and buffing machine which is said to reduce polishing and buffing costs to an absolute minimum.

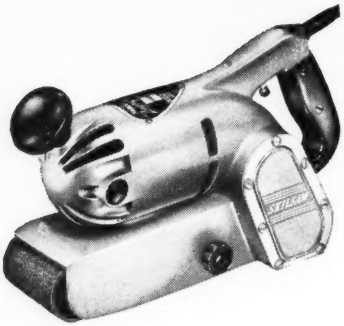




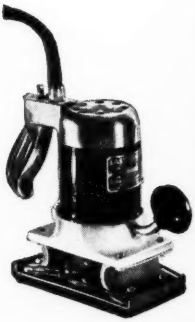
(Left)—A buffing and polishing lathe designated as the "Type MI" was placed on the market by Hanson-Van Winkle-Munning Co., Matawan, N. J.

(Right) — The illustration shows an infinitely variable speed buffing and polishing machine which was placed on the market by The Hisey-Wolf Machine Company, Cincinnati, Ohio.

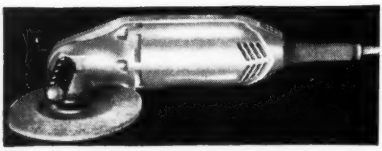




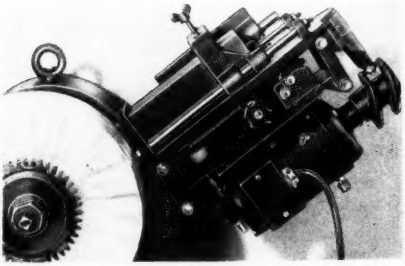
(Left)—A lightweight, 2¼-in. belt sander to be known as the "Zephyrplane Junior" was introduced by Skilsaw, Inc., 4743 Winnemac Ave., Chicago, Ill.



(Right)—The 1940 model portable, all-electric sander shown in the accompanying illustration is now being marketed by Detroit Surfacing Machine Company, 7433 W. Davison. The Easy all-electric, portable tool may be operated from any a.c. or d.c. light socket.

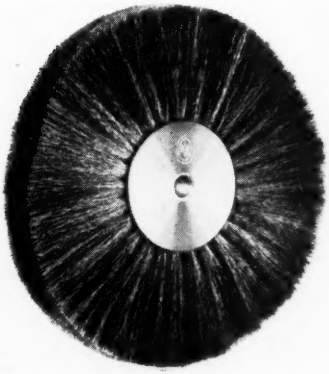


(Left)—Three additions to the Skilsaw Disc Sander line, known as the Models SP, H2, and SL, announced by Skilsaw, Inc., 5037 Elston Ave., Chicago, Ill.



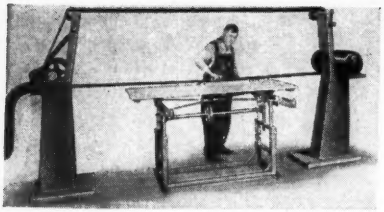
(Right)—A simple, compact, efficient and self-contained applicator for automatic application of buffing compounds to buffing wheels, to be known as the "Packer Electric Automatic Composition Applicator," was placed on the market by The Packer Machine Co., Meriden, Conn.

(Right)—Discs and polishing wheels for removing small blemishes on finished steel, to be known as "Brightboy," were placed on the market by Weldon Roberts Rubber Company, 351 Sixth Ave., Newark, New Jersey.



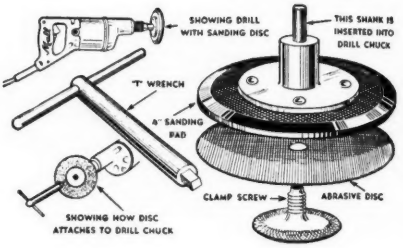
(Left)—A scratch brush designated as "Metl-Hub" brush was placed on the market by Hanson-Van Winkle-Munning Co., Matawan, New Jersey. The Metl-Hub brush has a one-piece circular metal hub of light weight alloy metal.

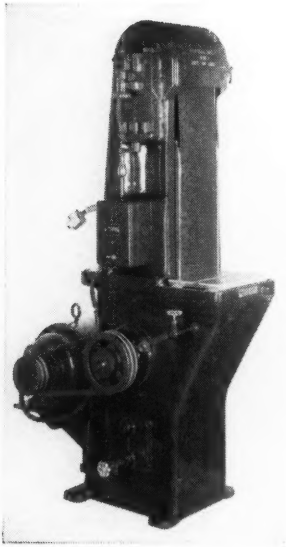
(Right)—Industrial Lubricants Co., Inc., 5736 12th St., Detroit, Mich., placed on the market a polishing wheel known as "Grainlock." This wheel is said to be constructed with the use of Grainlock cement.



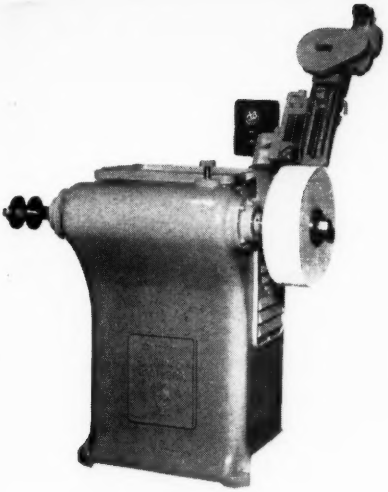
(Left)—Designed to eliminate band sanding and finishing, the Jefferson Endless Belt Sander shown in the illustration was placed on the market by Jefferson Machine Tool Co., Fourth, Cutter and Sweeney Sts., Cincinnati, Ohio.

(Right)—The sanding, rubbing, polishing and buffing pad shown in the illustration was placed on the market by Mall Tool Company, 7740 S. Chicago Ave., Chicago, Ill., for use on all makes of portable power tools and flexible shaft machines.


SHOWING DRILL WITH SANDING DISC
THIS SHANK IS INSERTED INTO DRILL CHUCK
"T" WRENCH
6" SANDING PAD
CLAMP SCREW
ABRASIVE DISC
SHOWING HOW DISC ATTACHES TO DRILL CHUCK

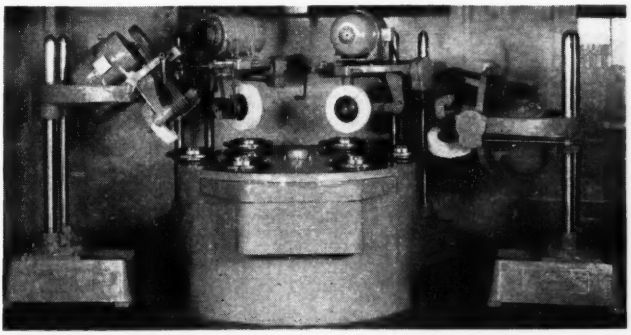


(Left)—A heavy-duty belt grinder equipped for dry or wet grinding was introduced by the Porter-Cable Machine Co., 300 Wolf St., Syracuse, N. Y. Designated as the Model G-8, the grinder can be operated at a range of speeds from 2,400 to 6,000 f.p.m. for use in grinding metals, plastics, ceramics, glass, rubber, and so on.



(Left)—A composition applicator which automatically and mechanically applies buffing compound to the face of buffing wheels in an exact controlled amount and frequency was placed on the market by Divine Brothers Company, Utica, N. Y. This applicator can be used in conjunction with lathes for hand buffing and is particularly adaptable to all types of automatic and semi-automatic buffing machines.

(Below)—A new line of automatic buffing and polishing equipment, developed to fill the need for buffing heads which can be quickly adjusted to any wheel position for successive and production finishing, was placed on the market by Murray-Way Corporation, 253 Vinewood, Detroit, Michigan.



Siefen Polisher's Brick

A polisher's brick which is recommended for removing oil or grease from wheels before they are reset with abrasive has been placed on the market by J. J. Siefen, 5657 Lauderdale Ave., Detroit, Mich. These bricks are available in the shape of a brick in the size of 2¼ by 4 by 8¼ inches.

The oil and grease absorption qualities of Siefen Polisher's Brick are said to make it ideal for cleaning wheels that are used for finish polishing or oiling in, on all grease or oil wheels, regardless of the material of which the wheels are made.

West Rubber Polishing Wheel

The West Company, Inc., Philadelphia, Pa., has announced the development of a soft rubber polishing wheel. It is claimed that these wheels combine substantial flexibility with set-up wheel performance. The "built-in" bond is said to elminate setting up and balancing operations and provide maximum efficiency due to the inherent qualities of the bond. Less than normal pressure is said to produce desired finishes efficiently.

The West soft rubber polishing wheels are easily dressed to any desired shape and are said to hold that shape for the life of the wheel.

Learok

A clean, fast-working composition for use in obtaining high lustre or a mirror finish on various types of metals to be known as "Learok" is manufactured and marketed by The Lea Mfg. Co., 14 Cherry Ave., Waterbury, Conn. A special process developed by this company has resulted in the production of "Learok" buffing and coloring compositions which are said to contain no free grease. This process of manufacture enables the production of a material which contains balanced binders having the property of thoroughly incorporating with the abrasive powders in amounts not excessive but of such a nature and of sufficient quantity to adhere firmly to the wheel and work efficiently.

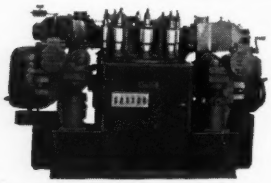
Having no free grease to transfer back on the work, the use of Learok compositions are said to eliminate the necessity of scrubbing or excessive cleaning. It is produced in cylindrical bars 2¼ in. in diameter by 7 in. long, weighing from 1¾ lbs. to 2¾ lbs., depending upon the grade.

Weka Grinding and Polishing Wheels

Grinding wheels made of the highest grades of materials are being marketed by Atlantic Weka Corp., 35 Wooster St., New York City. The best cotton, wool, and leather obtainable are used in the manufacture of these wheels, depending upon the service into which the wheel is placed.

The following recommendations for the grinding and polishing wheels are suggested: Woolen wheels for dry grinding; cotton wheels for grease grinding; and canvas wheels for rough and solid articles. Leather wheels are recommended where sharp edges are desired and for grease grinding only.

Bonding materials which are used in the application of abrasive to Weka



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wheels provide maximum adhesion. Weka Grinding and Polishing Wheels are available in a wide range of diameters, widths, and sizes of core holes. The wheels are designed to meet the requirements of practically every grinding and polishing operation.

Bias Type A Buffs

The Bias Buff & Wheel Company, 430 Communipaw Ave., Jersey City, N. J., announces a type of buff that has been specially designed to reduce high polishing costs in the buffing and finishing departments. Increased polishing surface, and the elimination of waste in both cloth and polishing compounds, together with the exceptionally good constructive features are points that the company emphasizes.

This buff is known as the Type "A" and is well adapted for all classes of work. Cloth from which Bias Buffs are made is produced in the company's own mills, and it is claimed that this cloth is unequaled for durability and long wearing qualities.

The Bias Buff & Wheel Company makes a line of guaranteed ventilated buffs for use where high speeds are necessary in certain kinds of buffing and finishing.

Hanson-Van Winkle-Munning Aluminum Oxide Polishing Grain

A fused aluminum oxide produced in an electric furnace is now being marketed by the Hanson-Van Winkle-Munning Company, Matawan, N. J., under the trade name of Vanite. Vanite is a polishing grain composed of bauxite from which impurities such as titanium oxide, iron oxide, silica, and so on, have been removed.

The Vanite grains are of the "blocky" type and as nearly equi-dimensional as possible and practically free from weak particles like flats and slivers. Grain size is closely controlled by screening and separation into oversize, nominal, and undersize. The nominal is the control product. Oversize is coarse and undersize is fine. Each keg of Vanite is subjected to a careful screen analysis to determine the percentage of the three sizes.

Grinding Wheel Data Book. The fourth revised edition of the Abrasive Company Grinding Wheel Data Book is now being issued by Abrasive Company, Tacony and Fraley Sts., Philadelphia, Pa. This data book contains complete descriptive information regarding the manufacture, use and application of grinding wheels. It also includes general recommendation tables and tables showing standard sizes and shapes.

Standard Bulletin No. 38-A. An infinitely variable speed buffing and polishing machine, recently developed by the Standard Electrical Tool Company, 1941 W. Eighth Street, Cincinnati, Ohio, is fully illustrated and described in Bulletin No. 38-A, now available for distribution. A speed changer making it possible to secure any spindle speed from 1,000 to 3,500 r.p.m. by merely turning a handwheel is incorporated in the machine.

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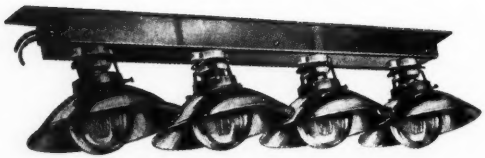
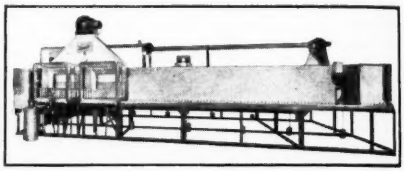
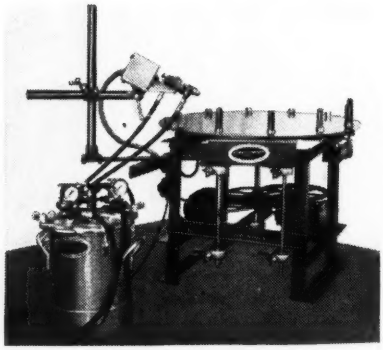
FINISHING



(Left)—North American Electric Lamp Co., 1020 Tyler St., St. Louis, Mo., placed on the market standard units of light banks for drying, heating, and dehydrating with radiant energy.

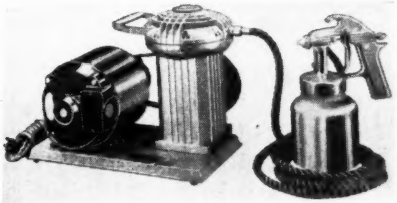
(Right)—Paasche Airbursh Co., 1910 Diversey Parkway, Chicago, Ill., placed on the market an automatic air finishing and drying unit designed for enameling flashlight cases and similar items up to 18 in. in length and baking the finish at temperatures ranging from 200 degs. to 400 degs. F.





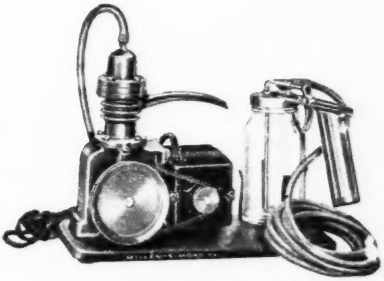
(Right) — The Eclipse Air Brush Company, Inc., 396 Park Ave., Newark, N. J., marketed an automatic sprayer which is designed to coat the inside and outside of steel tubes, four inches long and with an inside diameter of one inch.

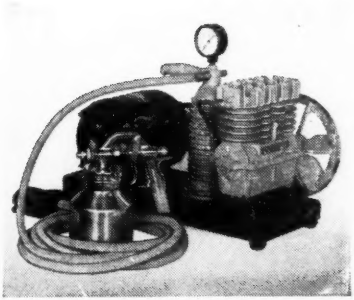
(Right)—A line of small spray painting outfits of streamline design, and known as the "NCB," was announced by The DeVilbiss Company, Toledo, Ohio. The line includes five different spray equipment assemblies each of which is built around a ¼-h.p. electric, motor-driven, air compressing unit.



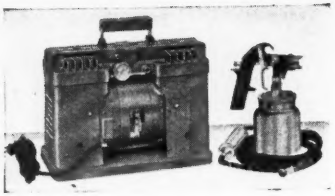
(Left)—A single diaphgram compressor known as the New Roche "DS" was placed on the market by Binks Manufacturing Company, 31114-40 Carroll Ave., Chicago, Illinois.

(Right)—Miller-Simons, Inc., 2900 South 61st Court, Chicago, Ill., has announced a line of paint spray equipment which includes spray guns, tank and portable compressor units, and a miniature paint spray unit for touch-up work and for miscellaneous service.

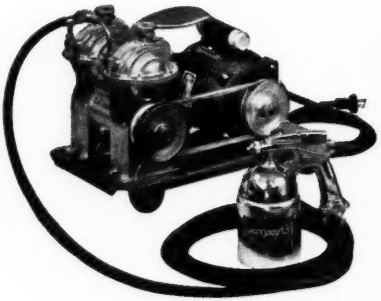




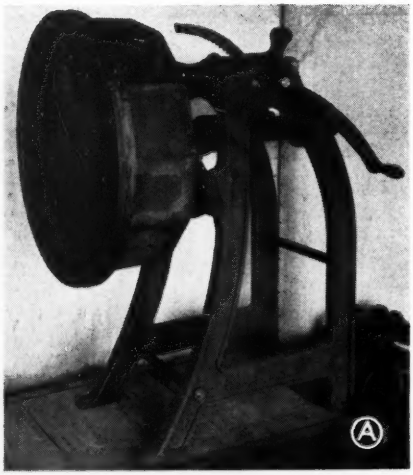
(Left)—A four cylinder portable spray outfit known as the "Empire Pressure King" is now being marketed by Empire Compressor Manufacturing Co., Inc., 13 E. Benson St. and Pennsylvania R. R., Reading, Ohio.



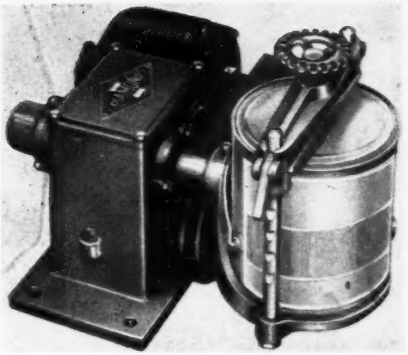
(Left)—The Crown Spray Gun Mfg. Co., 1218 Venice Blvd., Los Angeles, Cal., announced a complete line of ten "Airflo" portable painting outfits driven by ¼, ⅓, and ½-h.p. General Electric motors.



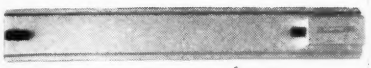
(Right) — A portable paint spraying unit with twin diaphragm cylinder compressor for fast painting performance, known as the "Sprayit Series 500" Paint Spraying Unit, was placed on the market by The Electric Sprayit Co., Sheboygan, Wis. This unit is designed for general maintenance painting in factories and finishing departments.



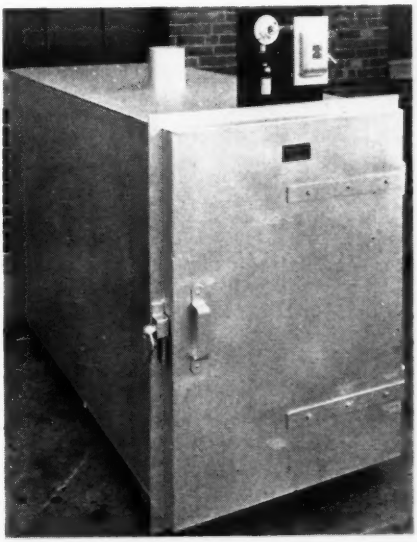
(Left) — The Baird Machine Company, Stratford Ave., Bridgeport, Conn., placed on the market a newly designed leg type lifting tumbler which is said to be simple in construction. The unit shown herewith is made of cast iron and the front end is said to be easily removable. An opening is also provided at one side.



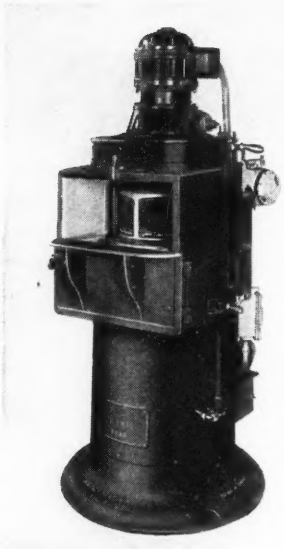
(Right)—A paint conditioner for industrial paints was placed on the market by the Diamond Iron Works, Inc., Minneapolis, Minn. This unit is built in two sizes: One for cans and buckets up to one gallon, and the other, from two to five gallons.



(Left)—Four infrared drying lamps in 250- to 1,000-watt sizes, designed for industrial jobs, was placed on the market by Westinghouse Lamp Division, Bloomfield, N. J.



(Right)—A small cabinet oven designated as the Model GKS was placed on the market by George Koch Sons, Inc., 2112 Pennsylvania St., Evansville, Ind. Thermostatic control is a feature of this oven. The oven may be thermostatically controlled at any point between 100 and 500 degrees.

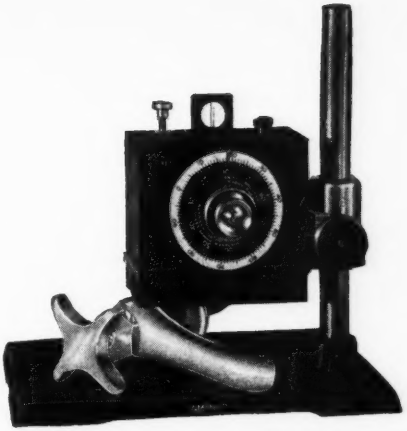


(Left)—A speedip enameling machine designated as the Model R-200 was placed on the market by Ronci Machine Company, 45 River Ave., Providence, R. I. The Model R-200 speedip enameling unit is designed for lacquering or enameling metal or plastic parts.

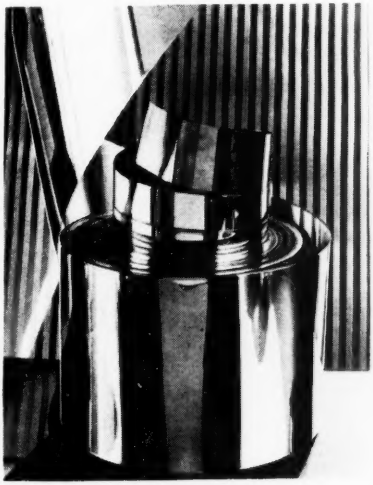
(Right)—A spray gun, known as the "Trojan," has been placed on the market by the Sharpe Manufacturing Company, 1224 Wall St., Los Angeles, Calif.

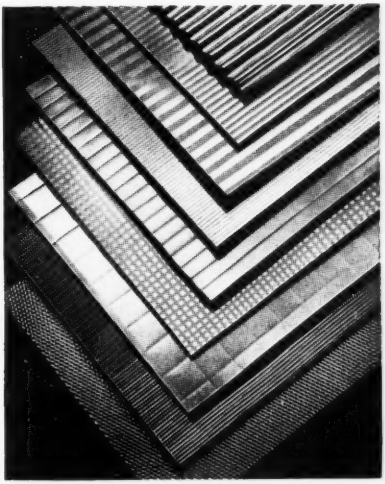
(Left)—A skin protecting preparation for workers in paint, lacquers, printing inks, chemicals, and so on, known as "Texkin," was placed on the market by Doster and Co., 4835 Rice St., Chicago, Ill. This material is available in the form of a soft, smooth cream and can be applied by rubbing carefully over all of the exposed skin surface before starting work.

(Right)—The "Magne-Gage," manufactured by the American Instrument Co., 8010 Georgia Ave., Silver Springs, Md., was improved to the extent that only one instrument is required to measure the thickness of coatings on metals merely by interchanging the different types of magnets.



(Below)—Two pre-finished bonded metals which are said to combine the flashing beauty and durability of chromium with the lightness, strength, and workability of aluminum were placed on the market by American Nickeloid Company, Peru, Ill. These two plated metals are known as Nickel Aluminum and Chrome Aluminum.





Ault & Wiborg Industrial Finish

An industrial finish which is said to have exceptionally low-temperature speed baking characteristics to be known as "Polymerin-100" has been placed on the market by Ault & Wiborg Corporation, Dept. PFJ, 75 Varick St., New York City. This development follows the original Polymerin, a speed-bake finish that was introduced by Ault & Wiborg some time ago. The Polymerin-100 formulation is said to make possible curing temperatures which are often as much as 100 deg. below those of the original Polymerin, thus extending this type of speed finish to the low-bake field.

Monofax

A durable, enhancing black finish for steel products to be known as "Monofax" has been placed on the market by Heatbath Corporation, Springfield, Mass. "Monofax" is said to be a highly developed, expertly fused material which, when dissolved in water and boiled at 290 deg. F., imparts a lustrous black finish to steel products. Operating at this low temperature, it is possible to apply this attractive black finish to metal parts without affecting hardness or temper.

The finishing process does not require expensive equipment or highly trained operators. It is said to require no special ventilating equipment or isolated working space. The solution gives off no poisonous fumes, thus the operation can be conveniently fitted into present production routines.

Seeking Finer Finishes?
AND OPERATING SAVINGS TOO!
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DESPATCH OVENS
Read about the many NEW DESPATCH FEATURES that improve finishes and permit new savings. They are presented for the industry in the new DESPATCH BULLETIN NO. 51
DESPATCH
OVEN COMPANY
MINNEAPOLIS MINNESOTA

A C P Rust-Proofer

A preparation which is said to stop rust under paint, prevent it from eating metal, and prolong the life of paint, to be known as "A C P Rust-Proofer," has been placed on the market by American Chemical Paint Company, Dept. 303, Ambler, Pennsylvania.

A C P Rust-Proofer is applied to metal surfaces by brushing, or with a spray gun, in as heavy a coating as will hold to a vertical surface. The chemical is allowed to air dry on the metal for four to twelve hours and then removed with water. When the rinsed surface is completely dry, it is ready to receive the first coat of paint.

Hommel Ground Coat

The O. Hommel Company, 209 Fourth Ave., Pittsburgh, Pa., ceramic suppliers, has announced the development of a blue ground coat. The Hommel blue ground coat is said to have a remarkably wide firing range, and will produce a smooth, satiny finish without excessive gloss. The ground coat is said to be ideal for thin cover coat applications.

According to the manufacturer, the Hommel blue ground coat will not burn off at the edges and will eliminate blistering caused by defective steel. The material will cover the most difficult shapes with ease.

Haynes Burn Proof Clear Synthetic

A burn proof clear synthetic material for coating metals has been placed on

the market by C. W. Haynes Laboratories, Inc., Springfield, Mass. This burn proof clear synthetic is water white clear. It is also said to be perspiration proof. Resistance to organic acids, caustic soda and yellowing are among its features.

Stanley Aluminum Finish

An aluminum synthetic finish which is said to have exceptional color, brilliance, adhesion, and durability has been placed on the market by The Stanley Chemical Company, East Berlin, Conn. This material is available in baking or air drying forms. These two forms have been designated as No. 66-H-1307 Aluminum Baking Synthetic and No. 66-H-1515 Aluminum Air Drying Synthetic.

Both of the aluminum finishes produce coatings which are said to closely resemble dull-chrome plated finishes. They are extremely durable, have excellent adhesion and weather resisting qualities, and are said to be so smooth that they produce an appearance of a continuous sheet of aluminum. On long standing, they are said to retain to a very high degree their color and leafing qualities. They are non-setting and only normal stirring is required before use.

Ballou Imitation Chrome Finish

An imitation chrome finish which is said to produce a beautiful imitation of a real plated finish has been placed on the market by Edward C. Ballou Company, 6 Varick St., New York, N. Y. The material is available in paste form and can be used with quick base synthetics or varnish type vehicles. The material can also be mixed with lacquers.

Vedoc

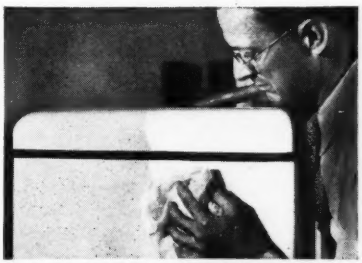
An organic metal coating material which is said to produce a smooth, hard film is now being marketed by Liquid Plastics Corporation, a division of Ferro Enamel Corporation, 4154 E. 56th St., Cleveland, Ohio. This finishing material will be marketed under the trade name of Vedoc.

Vedoc is available in white and black. No primer is required, since the material covers in one coat over unprimed surfaces. On unprimed metal, Vedoc is said to produce a glistening, smooth, hard finish that is unusually resistant to water, alkali, and acid. The material can be applied either by spray or dip and has excellent color retention. An outstanding feature of this finishing material is the high gloss, which in the white color stays white and is non-yellowing.

Vedoc can be baked at temperatures of 265 deg. for one hour, or 325 deg. for nine minutes in gas, oil, or electric ovens. The material can be baked in the newly designed infra-red baking ovens.

Vitra-Carlite Hammerkraft and Vitra-Carlite Spatter

Two finishes, to be known as Vitra-Carlite Hammerkraft and Vitra-Carlite Spatter, have been placed on the market by Hilo Varnish Corp., 42-60 Stewart Ave., Brooklyn, N. Y. These finishes



"MAGIC" TACK RAGS
IMPROVE YOUR FINISH 100%

MAGIC TACK RAGS remove specks, lint and sand particles--- bring out that deep, smooth luster, produce a faultless surface for white or colored finish. Why use "home made" tack rags when you can buy MAGIC TACK RAGS at trifling cost! They are tackier, do not dry--- are dust-proof and spontaneous combustion proof. Packed in dozen and gross lots or more. Made only by the

Wm. A. Juergens Co.
4036-40 Lagrange Street, Toledo, Ohio, U. S. A.
If your dealer does not carry Magic Tack Rags, write us for sample.

are said to be designed for use where beauty and durability are prime requisites, such as on circulatory heaters, coal and oil furnaces, hot water heaters, stove shells, and so on. Both finishes are said to have excellent adhesion, heat resistance, and toughness. The hammered and spatter effects require but two spray operations and only one bake. The length of baking is 20 minutes at 300 deg. F.

Pyroflex

A new inorganic finish to be known as "Pyroflex," which is said to further reduce burning temperatures of porcelain enamel, has been placed on the market by The Porcelain Enamel & Manufacturing Co., Eastern and Pemco Aves., Baltimore, Md. "Pyroflex" is said to burn at 1,400 deg., thus permitting the use of light gauge enameling stock or black iron.

Pyroflex, as the name indicates, will withstand heat and, according to the manufacturer, will not flake off when bent or flexed. No special metal bonding treatment is necessary.

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S-310

RUST INHIBITIVE

Formulated specifically for the following properties:

1. **Very fast air-drying**
2. **Water-whiteness**
3. **Tenacious adhesion**
4. **Hardness combined with flexibility**

and

RUST RESISTANCE

S-310

is used and recommended as a clear coating for hand tools, machine tools, hardware and wherever a clear protective coat for bright metal is required.

The Varnish Products Co.
5208 Harvard Ave. Cleveland, Ohio

Maas & Waldstein Developments

During the year, Maas & Waldstein Company announced the development of the following new products:

Raydur Enamels for Infra-red Baking. High gloss, semi-gloss, and wrinkle synthetic baking enamels especially developed for infra-red baking. They bake under adequate infra-red heat in 3 to 20 minutes and can be handled for assembly a half hour later.

Hammertone Novelty Finish. A new finish, called Hammertone, that closely resembles beaten metal. Supplied in copper, bronze, silver and other ornamental metallic colors for use in finishing a wide variety of products made of metal and Bakelite.

Codur Stove Enamels. A line of white, porcelain white, and colored enamels for use on stoves. Withstand high temperatures for many hours without objectionable discoloration; resistant to marring, hot grease, and kerosene.

Perspiration-Proof Lacquer. A new type of clear lacquer especially suitable for finishing articles frequently handled, such as flashlamps, pencils, compacts, lip-stick holder, and so on. It resists the corrosive action of perspiration and protects metal surfaces or enamel color coats.

High-Speed Grain Finish. A finishing schedule for the rapid application of wood grain on metals. It consists of a quick - drying Durad Speed primer, which receives the graining ink, and a top coat of air-drying or quick-baking clear lacquer.

Coprene Air-Drying Synthetic Enamels. A new line of air-drying chlorinated-rubber-base enamels, which dry dust-free in a very few minutes and so hard overnight, under normal application conditions, that they can be freely handled and will not "paper print." The adhesion and outdoor weather resistance are good, and flexibility improves with age. For use on all kinds of metal products, and also on wood with a surfacer to provide a smooth finish or without one to show grain.

Despatch Ovens. An attractive, informative, and pictorial bulletin designated as the No. 51 and describing Despatch Finish Baking and Drying Ovens for synthetic enamels, lacquers, varnishes, paints, enamels, and japans is now being issued by Despatch Oven Com-

pany, 622 S. E. Ninth St., Minneapolis, Minn. There are ideas galore about new finish baking and drying ovens, also helpful suggestions on modernizing present equipment. A copy of Bulletin No. 51 will be sent free upon request.

Magnus Skin-Gard. The Magnus Chemical Company, Inc., is now issuing a descriptive, illustrated folder on its product, Magnus Skin-Gard.

Magnus Skin-Gard is a cream which, when rubbed into the skin, protects it against chemicals, solvents, and dirt of all kinds—against dangerous infection, annoying cracks and abrasions. Workers whose skin comes in contact with solvents find Skin-Gard beneficial in preventing the solvents from removing the natural oils in the skin.

Magnus Skin-Gard comes in two grades; regular and waterproof. Waterproof Skin-Gard effectively protects the skin against water, acid and alkaline solution.

A copy of the Skin-Gard folder can be obtained by writing to the Magnus Chemical Company, Inc., 10 South Ave., Garwood, New Jersey.

Eclipse Catalog No. 77. The Eclipse Air Brush Company, Inc., 398 Park Ave., Newark, N. J., has just issued a catalog designated as the No. 77. This catalog is made up of 32 pages, 8½ by 11 in. in size, covering the complete line of Eclipse spray equipment for both manual and automatic operation. Included in this catalog is a section devoted to Pneumix air-motored agitators. A copy will be sent free upon request.

Kemick Bulletin. A bulletin describing "Kemick," a chemical that is said to stay put on heated metals, is now being issued by American Chemical Paint Company, Box 303, Ambler, Pa. One of the applications of Kemick recommended by the manufacturer is the coating of automobile engine exhaust manifolds, exhaust pipes, and mufflers.

When heated, Kemick is said to partly decompose, expelling volatile materials and chemicals are liberated to react on the metal surface to become a part of it and to neutralize rust producing agents.

Kemick can be applied with either a brush or spray gun, or small parts can be dipped into a bath of thoroughly mixed Kemick. This coating material is nearly black when aplied but when heated turns to a dark gray cast which it is said to retain throughout its life. Other applications of this material include boilers, electric furnaces, smoke pipes, flues, and other highly heated surfaces.

A copy of this bulletin will be sent free upon request.

Within Our Circle. An interesting and timely booklet has just been published by the Ferro Enamel Corporation, 4150 E. 56th St., Cleveland, Ohio, manufacturers of Ferro porcelain enamels.

The booklet presents a roll-call of all of the members of the Ferro Research and Laboratory Staffs. The education, previous experience, and present duties of each man are briefly outlined.

Copy free upon request.

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WOOD WOVEN PLATING BARRELS

FOR ANY MECHANICAL PLATING EQUIPMENT

We Hope You Had
A Merry Christmas
and We Wish You
A Happy New Year

Write for illustrated folder.
Use them once—you'll use them always

JOHN KING
48 SPRINGFIELD ST., DAYTON, OHIO

News OF THE INDUSTRY

National Defense Program Key Topic of Oakite Sales Conference

How the metal-working, machine tool, transportation, and other industries are rapidly responding to the call for greater production capacity and speeded-up output to meet National Defense requirements was the key theme of talks by several industrial leaders at the recent annual technical sales conference of the New York and Northeastern and Philadelphia and Southeastern Divisions of Oakite Products, Inc., 20 Thames St., New York City. Held at the Hotel Pennsylvania in New York City, the two-day session was attended by Oakite Service Representatives from Maine to Florida, together with members of the company's technical and service staffs.

Among those who addressed the meeting were Erik Oberg, editor of "Machinery"; C. B. Peck, managing editor of "Railway Mechanical Engineer," and Lieut. Col. L. A. Codd, managing editor of "Army Ordnance."

Various new Oakite developments were announced in connection with the cleaning of aluminum before anodizing, cleaning aluminum before spot welding and other operations where cleaning is of prime importance in the manufacture of defense items.

Magnus Acquires Additional Manufacturing Space

Magnus Chemical Company, Inc., 10 South Ave., Garwood, N. J., manufacturer of industrial cleaning materials, industrial soaps, and metal-working lu-

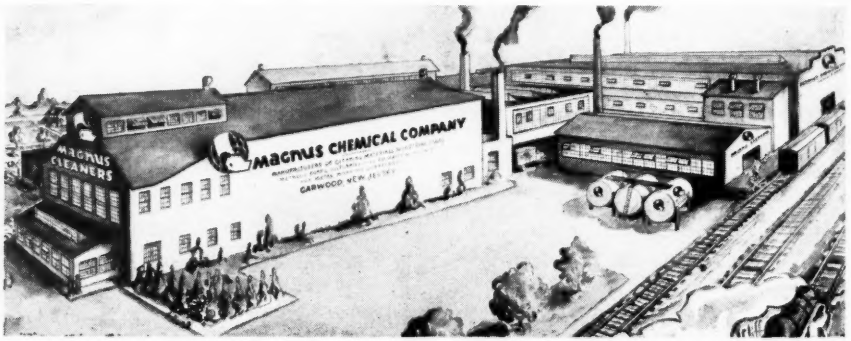


Illustration showing buildings now occupied by Magnus Chemical Company, Inc.

bricants, announces a substantial increase in its manufacturing space. On August 1, four additional buildings were taken over, representing an increase of manufacturing area of over 120 per cent.

The buildings have been completely renovated and the installing of new equipment, for use in the making of the materials manufactured by the concern, is now in process.

One building of brick and steel construction will house the new grinding and milling department, where many of the new developments and products being manufactured by this firm will be made.

Grand Rapids A.E.S. Annual Educational Meeting and Banquet

The Annual Educational Meeting and Banquet of the Grand Rapids Chapter of the American Electroplaters' Society will be held Saturday, January 18, 1941, at the Rowe Hotel, Grand Rapids, Mich., beginning at 1:30 p. m.

Mr. Walter Pinner, of the Houdaille Hershey Corp., will preside at the educational session.

The guest speakers are as follows:

Wm. M. Phillips, of General Motors Corp.
Subject: "Weather as a Basis for Corrosion Tests."

P. R. Pine, of Harshaw Chemical Company.
Subject: "Finishing of Die Castings."

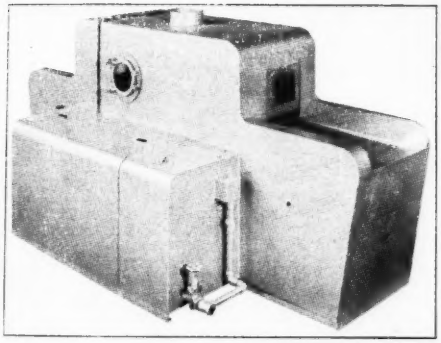
O. S. True, of United States Rubber Company.
Subject: "Uses of Rubber in the Electroplating Industry."

J. P. Butterfield, of Rustless Iron & Steel Co.
Subject: "Development, Uses and Electroplating of Stainless Steel."

Green Electric Moves to Larger Quarters

The W. Green Electric Co., Inc., New York City, has announced its removal to larger quarters at 130 Cedar St., New York City. This move has been necessary due to expanded business and the combination of manufacturing facilities with the main office.

METAL WASHING OR DEGREASING



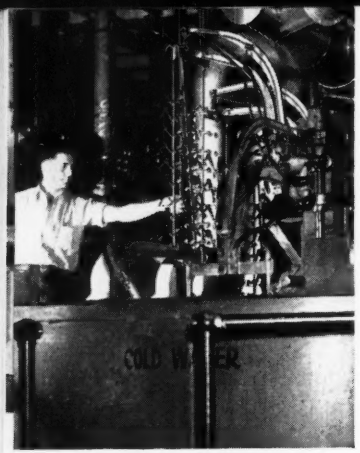
We have the answer to your cleaning problems. If you are having trouble with your metal cleaning or if you require modern production methods, BLAKESLEE has the answer.

Small or large problems in production can be solved immediately from our experience of over fifty years as cleaning specialists.

One of our experienced engineers will be pleased to call on you to discuss your problems, no obligation involved.

G. S. BLAKESLEE & CO.

New York **CICERO STATION-1, CHICAGO, ILL.** **Toronto**



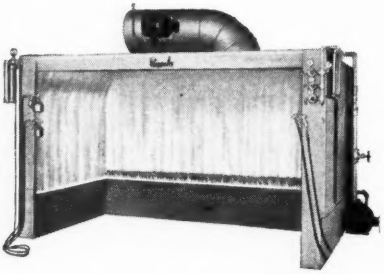
New PLANT EQUIPMENT AND Materials

Paasche Water Wash Airfinishing Booth

The Paasche Water Wash Airfinishing Booth shown in the accompanying illustration is now being marketed by Paasche Airbrush Co., 1910 Diversey Pkwy., Chicago, Ill. This booth is available with the water wash located at the back, the sides, and the bottom. The water wash construction below the shelf is a particularly desirable feature when shelf type water wash booths are selected.

The Paasche Water Wash Airfinishing Booth includes panels, a wash chamber, settling pan, eliminator plates, nonclogging nozzles, removable strainer, float valve and the flow water of four gallons per minute, per foot of booth width, providing a cleaning and washing operation.

The Paasche Water Wash Airfinishing Booth is said to effectively wash away all overspray by means of a curtain of water. Solid material is prevented from accumulating on the rear and side walls, ventilating pan, and exhaust piping. The Paasche Water Wash Airfinishing Booth is available in a variety of types and sizes.



Paasche Water Wash Airfinishing Booth

Watson-Standard Heat Resisting White Finish

A high heat resisting white finish designed as a coating for metal objects which in use are subjected to temperatures of from 400 to 500 deg. F. is now being marketed by The Watson-Standard Co., 225 Galveston Ave., Pittsburgh, Pennsylvania.

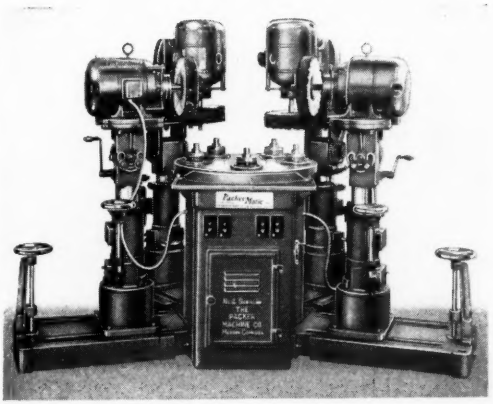
This white finish is said to hold its color as well as its permeability at high temperatures. The finish can be applied by roller coating or spraying and is said to be an ideal baking type material. For best results, a baking schedule of 325 deg. F. for approximately 20 minutes is recommended.

M & W Coprene Enamels

A line of synthetic enamels that are said to air dry hard in 24 hours and are to be marketed under the trade name of "Coprene" have been developed by Maas and Waldstein Company, 438 Riverside Ave., Newark, N. J. These finishes have a chlorinated-rubber base and become very hard overnight under normal application conditions.

Packer-Matic
Automatic
POLISHING & BUFFING MACHINES

Automobile Parts and Accessories manufacturers find Automatic Finishing on Packer-Matic steps up their production and cuts Finishing Room costs. Varied shapes and sizes, in all metals, are being more uniformily Finished, at a saving, on any one of three types of Packer-Matic—



- **Rotary**
- **Straight Line Conveyor**
- **Roll**

Cut Your Finishing Costs—Send sample Part and get a Time Study, gratis — WRITE "Time Study" Dept.

THE PACKER MACHINE CO. MERIDEN, CONN., U.S.A.

The hardening of Coprene enamels is not merely a surface change, according to the manufacturer, but extends throughout the entire coating, thus making it resistant to handling, wrapping, and so on. Similar hardening can be obtained by force drying the finish for one hour at 200 deg. F.

Coprene enamels are available in clear, black, white, and colors, and also in silver, copper, and other metallic lustres. According to the manufacturer, Coprene enamels have good adhesion and resistance to outdoor weather and household chemicals, and retain their gloss, flexibility, and color.

U. S. Dust Collector

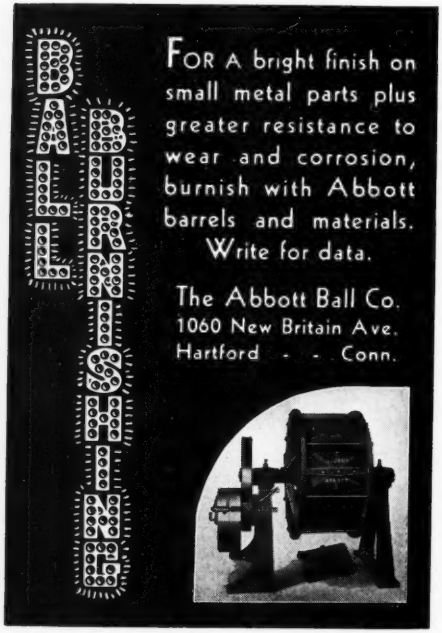
The United States Electrical Tool Co., Cincinnati, Ohio, is now offering a dust collector which can be used with any grinder or buffer having wheels up to 18-in. diameter, 3-in. face. The dust collector is a self-contained all-metal unit designed for use in removing dust and other abrasive particles from the air.

The dust and abrasive laden air is drawn into a filter cabinet, striking a baffle wall which directs the air downward to the bottom of the filter cabinet

U. S. Model No. 500 Utility Motor-In-Head Grinder Equipped with Dust Collector

where heavy particles are deposited. The air is then directed upward through an all-metal filter pad and later returned to the room from the top of the filter cabinet. The suction fan and motor are located in the top of the cabinet and operate in clean air.

Shown in the illustration is a U. S. Model No. 500 Utility Motor-In-Head Grinder equipped with dust collector. The grinder has a push-button starter with overload protection, ball bearings enclosed in dust-tight housing, enclosed adjustable wheel guards, dustproof anti-friction bearings, tool tray, and lift-out water pot.


FOR A bright finish on small metal parts plus greater resistance to wear and corrosion, burnish with Abbott barrels and materials. Write for data.
The Abbott Ball Co.
1060 New Britain Ave.
Hartford - - Conn.

DeVilbiss Automatic Water Drain

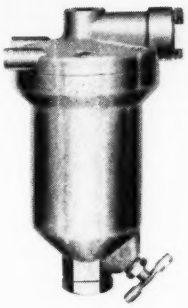
An automatic water drain for use in compressed air lines, which is said to be simple in construction, positive in action, and thoroughly trouble-free in operation, is now being marketed by The DeVilbiss Company, 300 Phillips Ave., Toledo, Ohio.

This new automatic water drain, available with four convenient fitting assemblies, is intended for installation in air lines, on air compressing outfits, or air receivers. It is to be known as DeVilbiss Type HOD.

The HOD automatically drains the air

line or air receiver, preventing water from being carried into the tool being used. It thereby prevents rusting and corroding, and assures a supply of air free of any moisture.

Use of the HOD is especially desirable in the spray painting field, where its use insures against the possible deposit of moisture on freshly finished surfaces.



DeVilbiss Automatic Water Drain

The HOD eliminates the necessity of daily hand draining, and provides protection against such factors as carelessness, oversight, or unusual atmospheric conditions.

The new DeVilbiss Water Drain is operated automatically by a slight fluctuation of the main line air pressure. A variation of as little as five pounds is sufficient for its operation. A manual drain is provided for use in periods when the main air line is not in use.

Installation of the HOD is no problem. Included in each of the four fitting assemblies available for use with this water drain are all of the copper tubing, hand valves, brackets, and connections needed for its installation in the specified manner.

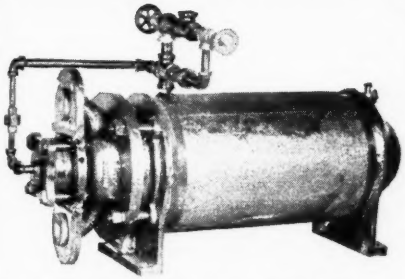
The DeVilbiss Automatic Water Drain, type HOD, is being made available as standard industrial equipment. It will supplement the already extensive line of industrial equipment manufactured by The DeVilbiss Company.

Rogers Stik Pumice

Pumice pressed into round sticks 7½ in. long and 2½ in. in diameter to be known as "Stik" pumice for dressing down and cleaning grease wheels has been placed on the market by William R. Rogers, 8 Proctor St., Salem, Mass. The sticks weigh about one pound each and are compactly pressed so that the particles of pumice do not part or break away when handled by the operator.

When the Stik pumice is placed in contact with a revolving grease wheel, the particles of clean white refined pum-

External heating of cleaning and plating solutions with Duriron Heaters



Low pH plating solutions, and the advantages of heating both plating and cleaning solutions, make external heaters, as illustrated, highly desirable.

No solution contamination... more uniform results... fewer rejections ... reduced plating time ... increased production capacity — are some of the advantages obtained by the use of Duriron Heat Exchangers.

Write for Bulletin No. 1601 for detailed information — no obligation, of course.

THE DURIRON COMPANY, Inc.
431 N. FINDLAY ST. • DAYTON, OHIO

ice are said to form a cross section. A slight pressure of the Stik pumice to the grease wheel is said to result in a clean wheel ready for the application of glue for the reset.

The handy stick shape of Stik pumice is said to make it convenient for the operator to apply. Stik pumice is dry and contains no greases, wax glues, and so on, that might have a tendency to "fill" the wheel.

Small bars of Stik pumice 1½ in. by 1½ in. by 4 in. are recommended for cleaning new buff wheels of loose ravellings and to condition the wheel prior to use.

Reznor Gas-Fired Unit Heaters

A line of gas-fired unit heaters for use in offices, factories, storerooms, and similar places has been introduced by the Reznor Mfg. Co., 163 James St., Mercer, Pa. The heaters require no water or steam for operation and are scientifically constructed to throw heat evenly over large areas. They are supplied in three types, fan, blower, and duct, each of which is available in five sizes to provide from 55,000 to 200,000 B.T.U.

The fan type heater is equipped with a four-blade, electrically-driven propeller fan. The fan, situated behind the heater cabinet, drives the cool air of the room over a streamlined heat exchanger and into the room, the air being heated in the process. Due to its streamlined design, the heat exchanger reduces air noise to a minimum and provides almost perfect heat transfer.

Reznor Gas-Fired Unit Heater

Products of combustion are carried from the combustion chamber into the flue chamber and then to the chimney or flue, thereby never coming in contact with the air being heated.

Blower and duct type unit heaters correspond in design and operation to the fan type heater except that the blower type is equipped with a blower instead of a fan and the duct type with neither blower nor fan. The blower type is especially efficient where the installation must be made in connection with a duct system, because of the air resistance encountered in such a system. The duct type heater is designed especially for use in a system where the air is supplied by a remotely situated blower of proper capacity for the total number

for

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NALCO DRITHERM CARBON LAMPS

Cut drying costs . . . Save time . . . Use minimum space . . . Get uniform results.

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NORTH AMERICAN ELECTRIC LAMP CO.
1020 Tyler Street St. Louis, Mo.

WRITE FOR LATEST CATALOGUE ON
NEW LOW COST PLATING
with HOBART Electroplating Equipment
HOBART BROS. CO., Box PF-11 Troy, Ohio, U.S.A.

of duct unit heaters employed.

Reznor Gas-Fired Unit Heaters can be furnished to burn natural, manufactured, or liquified petroleum gas, and are completely equipped with automatic controls for safe and efficient operation.

Devilac Enamels

Air-drying and baking type enamels which are said to be anti-acid and anti-alkaline, to be known as "Devilac," have been placed on the market by Rogear Company, 11 Water St., New York City. The enamels are said to resist commercial acids such as sulfuric, nitric, hydrochloric, and so on, and also alkalies and gases.

Air-drying Devilac enamels are said to dry in less than 10 minutes. Baking types are available for baking for 30 minutes at 250 deg. F. or for 20 minutes at 275 deg. F.

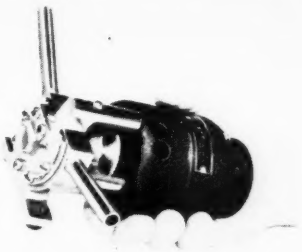
Devilac enamels are recommended for steel containers, tanks, and steel constructions of all kinds. They are also recommended for plating equipment such as plating racks, tanks, and so on.

Eastern Midget Positive Pressure Pump

A midget positive pressure pump designated as the Model "UT" has been placed on the market by Eastern Engineering Company, 45 Fox St., New Haven, Conn. This pump is said to be ideal for any application in which the location of tanks and containers make the self-priming feature essential. In addition to the self-priming feature, this pump is said to be unusually compact and capable of maintaining high pressures. The light weight and small size of the Model "UT" make it particularly adaptable to installation requiring the pumping of thin liquids where weight and space involved must be maintained at a minimum:

The maximum pressure is 35 lbs. per sq. in. and the maximum volume is three gallons per minute. The UT Midget Positive Pressure Pump is 6 in. by 3 in. by 2½ in. in size and weighs 3½ pounds. It is powered by a Universal fan cooled type, 1/20 h.p., 115 volt, a.c. or d.c. motor. The stuffing box of the unit is adjustable by means of a hand-operated adjustment wheel.

Nozzles on the Model UT Midget Positive Pressure Pump are designed for use with ⅜ in. inside diameter rubber hose only, and are not threaded for pipe fittings. The nozzles are removable and



Eastern Midget Positive Pressure Pump

may be replaced with standard ⅛ in. pipe.

The motor armature and pump impeller are mounted on a single shaft, making coupling unnecessary and thus assuring perfect alignment.

The pump unit is chromium plated bronze and the motor is finished with black crackled paint.

OVENS

BY GKS

have helped scores of manufacturers who had paint baking problems. YOUR inquiry for information on the complete line of GKS paint baking ovens will receive our immediate attention. Our engineers are at your service for consultation on oven problems. Address your inquiry to "OVEN DIVISION" of

GEORGE KOCH SONS, Inc.
EVANSVILLE, INDIANA

Quasol No. 11

Quaker Chemical Products Corp., Conshohocken, Pa., has placed on the market a material for removing buffing compounds, grease, or similar foreign matter from metal under the trade name of "Quasol" No. 11. This product is said to be compatible with most mineral solvents to form a clear liquid of extreme penetrating and emulsifying properties.

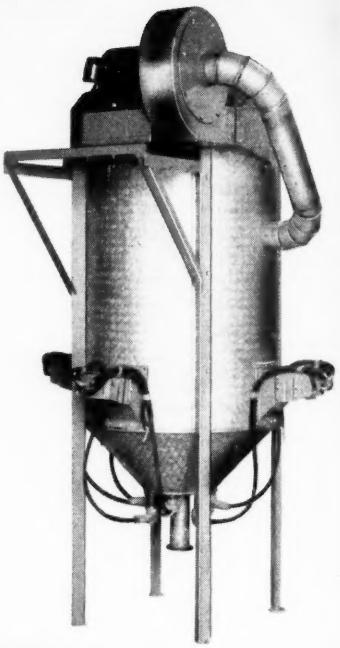
In use, a mixture of one part Quasol No. 11 and 7 to 12 parts of kerosene or similar solvent is recommended. The Quasol No. 11 solvent mixture can be applied by spray washing machine or still tank. The work to be cleaned is subjected to the solution for one to three minutes, depending upon the strength of the solution. Following this, the work can be rinsed and is said to be ready for the electro-cleaning process before plating or other finishing operations.

Quasol No. 11 is said to be rapid and thorough in its action and, according to the manufacturer, does not tarnish highly oxidizable metals.

Leiman Semi-Automatic Sandblast Machine

A semi-automatic sandblast machine for use in the cleaning or finishing of various materials as well as for stenciling letters and designs on a wide variety of small or medium sized parts is announced by Leiman Bros., 186-3K Christie St., Newark, N. J. The machine is completely self-contained, all work being performed under cover and without the discomfort of flying sand or dust particles. Around the machine are three motor-operated revolving tables, each having 6 or 12 holding fixtures. Each holding fixture is designed to hold one piece of work.

In operation, the holding fixtures of a revolving table are loaded and the table is revolved until a workpiece is introduced into the side of the cylindrical sandblast cabinet and positioned directly beneath two enclosed sandblast nozzles. After pausing beneath the nozzles for a prearranged time, the table rotates to the next fixture located on its top, thereby bringing another workpiece under the nozzles. This procedure is followed continuously until all workpieces have been brought beneath the nozzles for sandblasting. The same procedure takes place simultaneously at the other two revolving tables. An operator sitting in front of each revolving table removes a finished workpiece when the table comes to a standstill for the sandblasting of a work-



Leiman Semi-Automatic Sandblast Machine

For a real good polishing job use
KEYSTONE EMERY
TURKISH — NAXOS — AMERICAN
KEYSTONE EMERY MILLS *Write for Sample* **4316 Paul St., Phila, Pa.**

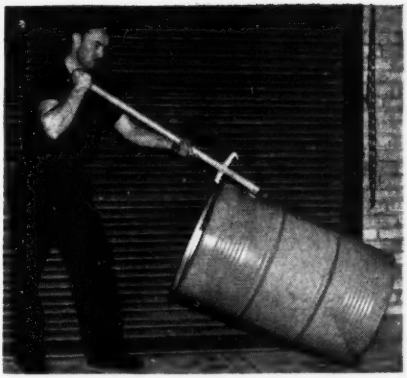
piece on the opposite side of the table, replacing it with a new piece to be sandblasted. The removing and replacing of workpieces is repeated continuously.

The sandblast with its three enclosed nozzle stations of two nozzles each is cylindrical in shape and is equipped with a strong suction motor-driven dust collecting fan and dust separator. The dust collector maintains an in-drawing draft at each nozzle station, thereby preventing the outward escape of dust, a feature which is said to make the entire operation of the sandblast clean and comfortable. A cleanout section is provided for the removal of all spent sand in the form of dust deposited in the cleanout section by the dust separator.

The nozzles of the Leiman Sandblast Machine are fed continuously with abrasive, whether the abrasive employed be ordinary sharp white sea sand or various grades of flint, emery, carborundum, or crushed or granulated steel. The abrasive is used over and over again until entirely consumed or reduced to the fineness of dust and deposited in the clean-out section. A supply of air is required to operate the sandblast machine, which can be arranged for use with practically any degree of pressure or any volume of air.

Lewis-Shepard Barrel and Drum Tipper

The Lewis-Shepard Sales Corporation, 295 Walnut St., Watertown, Mass., has developed a device for the safe handling of barrels and drums. This simple but practical tipper consists of a strong handle with a pronged collar which is adjustable. This adjustable collar allows the tipper to fit all types of drums and



Lewis-Shepard Barrel and Drum Tipper

large or small-bilged barrels. Its job is to make quick and easy and safe the job of tipping barrels from a horizontal to vertical position or the reverse.

The long handle increases the leverage so that much less effort is required to handle barrels or drums than in the ordinary manner without the tipper.

Murco Unit Heater

A vertical projection type unit heater has been announced by D. J. Murray Mfg. Co., Wausau, Wis., under the trade name "M Series Murco." This heater is an addition to the line of unit heaters previously manufactured. The "M Series Murco" vertical projection type unit heater illustrated here is made with the heating element all-copper and bronze, with few brazed joints. The copper fins are metallically bonded to the copper tubes, thus providing an effective permanent bond that is said to maintain contact

"Glazing Shoulders" Before Mirror Finishing with 4F Turkish Emery

The W. R. Case & Sons Cutlery Company, Bradford, Pa., uses "Indian Brand" 4F Turkish Emery to glaze shoulders of knives before mirror finishing.

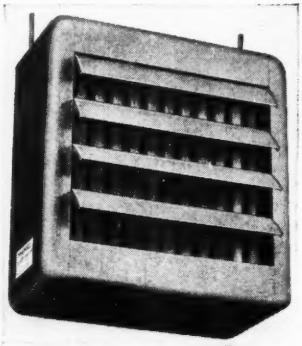
"Indian Brand" Turkish and Naxos Emery and "Hecco Brand" American Emery are absolutely uniform and of the highest quality . . . they have greater capillarity and longer wear . . . they will be delivered promptly.

Write for your trial lot—today.

HAMILTON EMERY & CORUNDUM CO. Chester Mass.

even at unusually high temperatures.

Some of the uses for the vertical projection type unit heater are in blanking of cold drafts in front of doorways, market buildings, offices, public buildings,



Murco Unit Heater

industrial plants, warehouses, garages with high ceilings, or any building that has a wide area to be heated. The M Series Murco vertical projection type unit heater is made in all models to meet various requirements.

Clark "Utilitruc" Lift Truck

A lifting, carrying and tiering fork truck designed to handle loads as heavy as 7,000 lb. and tier them in piles 15 ft. high or higher, to be known as the Clark "Utilitruc" Lift Truck, has been introduced by the Clark Tructractor Div., Clark Equipment Co., Battle Creek, Mich. The truck is said to be particularly efficient in car loading and unloading operations, in utilizing storage capacity to the full by high stacking, and in supplying production machines with materials and parts from storage. Gas-powered, it is capable of 24-hour continuous operation.

The Clark Utilitruc Lift Truck is made in several models, including straight lift, tilting, and telescopic tiering. The minimum height of the unit is 61½ in., thereby enabling it to clear low doordays, and the minimum capacity is 1 ton. The truck heavy steel fingers with chisel points vary in length and are adjustable sidewise on the front plate. According to the manufacturer, the operator inserts the fingers under any cleated or uncleated load, lifts the load clear of the floor, tilts it back 10 deg. in 1 sec. for easy riding, elevates it at the rate of 7 in. per sec., and tilts it forward 3 deg. in ½ sec. for easy tiering.

The Utilitruc is powered by means of a six-cylinder heavy duty tractor-type motor, travels at speeds from 1 to 7

Clark "Utilitruc" Lift Truck

m.p.h., climbs ramps under load, and has rear wheel steer and hydraulic brakes. The lifting unit is powered by means of an hydraulic vane type oil pump which is driven by a special direct drive from the motor and runs constantly at two-thirds engine speed.

Hammond Abrasive Belt Polisher

Hammond Machinery Builders, Inc., 1622 Douglas Ave., Kalamazoo, Mich.,

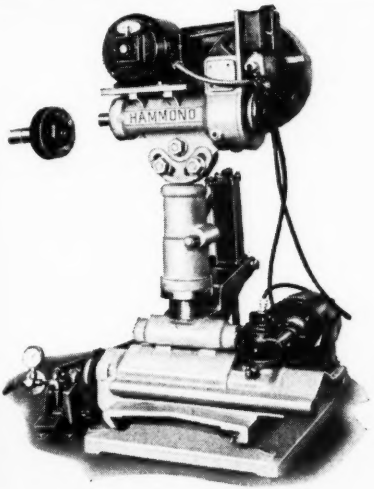
TEXKIN PERFECT SKIN PROTECTION

A soft harmless cream which when applied to the hands, arms and other exposed surfaces dries in a minute to a thin, invisible tough film that protects against paints, lacquers, enamels, dirt, grease and grime. Removed with ordinary gentle toilet soap and water leaving the skin fresh, clean and smooth. Used in industrial plants throughout the U.S.A. Quarts, 70c; gallons, $2.20, delivered. Send for Giant Trial Tube (only 30c) or ask, on firm letterhead, for liberal free sample.

DOSTER & CO. 4831 RICE ST. CHICAGO

has recently brought out an abrasive belt stand for use in conjunction with polishing and buffing lathes.

The illustration herewith shows the abrasive belt stand with a Hammond



Hammond Abrasive Belt Polisher

Model 7-CH Rite-Speed Lathe. The abrasive belt polisher shown here is equipped with five inch belt. However, wider or narrower belts can be furnished to suit particular requirements. Proper tension of the belt is maintained by an adjustable tightner pulley and the belt can be quickly removed and replaced.

Electroplating Colalloy, Aluminum and Its Alloys

Joseph Steel, director of research, of the Colonial Alloys Company, E. Somerset and Trenton Ave., Philadelphia, Pa., Chemicals Division, announces an easy method of commercially electroplating Colalloy, aluminum and aluminum alloys. This applies to all of the known alloys.

The process consists of a two to four minute dip in a solution known as "Pre-plate," which is furnished by the company. There is no electrolytic preparation necessary and the chemical solution is used at room temperature. After this dip, the product is ready for the regular plating bath. No special tanks or equipment are necessary. The size of the work is not a limiting factor.

Heretofore, it has been well known that aluminum base metals were difficult to electroplate due to the stubborn and instant forming oxide on the surface of the metal. Various methods, from chemically etching the base metal, to building up the oxide, have been in use but have either lacked efficiency, required costly equipment or took too much time to be commercially feasible.

Using the Pre-plate method for electroplating Colalloy, aluminum and its alloys, there is no difficulty with the oxide coat, the bond is efficient and strong, there is no special equipment needed and the preparation time is but from two to four minutes.

Pre-plate creates an excellent dense bonding base for the metal that is to be plated on it. It lends itself to direct plating of such metals as gold, silver, copper, cadmium, and the other alkaline plating baths on the aluminum base metals. Nickel, chromium, and other metals are plated over copper, after Pre-plating.

Pre-plate and its subsequent plating

METAL CLEANER

The Binder is SOFT RUBBER
It CUSHIONS *the Abrasive*

for FINISHING, PRE-FINISHING
POLISHING *and* PRE-POLISHING
METALS

Leaves a bright, smooth polished surface

MADE IN *DISCS, WHEELS* AND *TABLETS*

Write for Samples

WELDON ROBERTS RUBBER CO.
NEWARK, NEW JERSEY, U. S. A.

gives to the aluminum base metals increased corrosion and abrasion resistance, as well as decorative value. Many cases where it was necessary to use an oxide coat for both protective and decorative purposes, now lend themselves to this method of electroplating.

The aluminum base metals, heretofore restricted in use because of inadequate protective and decorative value, now can broaden their field. Such items as reflectors, trim parts, hardware, mouldings, architectural forms, novelty ware, jewelry, kitchen ware, appliances, aviation equipment, automotive parts, and many other products too numerous to mention, can enjoy this long felt need.

Wilson "Industrial" Infra-Red Drying Reflector

Wilson "Industrial" Infra-Red Drying Reflector

Wilson Lighting, Inc., 411 S. Clinton St., Chicago, Ill., has developed an infra-red drying reflector, to be known as the "Industrial" reflector, that is said to fill the need for a fast and economical process for drying, heating, and baking in metal finishing. The assembly is designed so that it may be used in any combination of reflectors to fit any size job or type of installation.

The reflectors are focused for parallel beam concentration, thus producing an even heat pattern that is said to penetrate deeply and provide thorough and uniform drying. A "tunnel" arrangement of the Industrial infra-red drying reflector has been developed. This unit is said to be instantly adjustable to any shape through the use of a unique design.

WE RECOVER YOUR
SOLVENTS and THINNERS
from Sludge, Waste, Wash,
Spoiled Lacquers, etc.
AND SAVE YOU MONEY
Each shipment—one drum or a carload—receives
PROPER and SEPARATE TREATMENT.
Write to:
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LISTER AVE. & BROWN ST., NEWARK, N. J.
or
HAMMOND CHEMICAL SERVICE, Inc.
241 BRUNSWICK ST., HAMMOND, IND.

Cramer Model D2 Interval Timer

The Cramer Model D2 Interval Timer shown herewith, product of The R. W. Cramer Co., Inc., Centerbrook, Conn., is designed primarily for the control of industrial equipment which can be automatically timed. The timer can be applied to various types of mixers, tumbling barrels, heat treating furnaces, and laundry machines, as well as to many other pieces of industrial equipment on which timers may be subjected to excessive moisture and dust conditions.

The Model D2 interval timer is driven by means of a self-starting synchronous motor and is enclosed in an especially built, dust-tight and splash-proof cast aluminum housing arranged for conduit connection and provided

with a full vision and external setting knob. Front view bull's eye light signals can be supplied on order.

Cramer Model D2 Interval Timer

The Cramer Model D2 Interval Timer is available in 12 different scales ranging from one revolution in 15 seconds to one revolution in 24 hours. Three-inch diameter dials with large, white etched characters against a black enameled background provide good vision and facilitate accurate setting. The non-clouding type of window which is made of unbreakable material, is recessed and gasketed to provide a dust-tight and splash-proof enclosure.

A slight inward pressure on the sturdily constructed knob assembly engages a clutch for setting the timer. When released, a spring and gasket prevent entrance of moisture around the control shaft. The black crackle finish cast aluminum housing is provided with two ½-in. threaded conduit openings. The cover is screw fastened, made of ⅝-in. black Bakelite, and is sealed by means of a rubber gasket.

National Controlled Abrasives

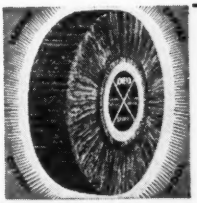
The National Metal Abrasive Co., 3560 Norton Rd., Cleveland, Ohio, is now manufacturing and marketing steel shot and grit known as "Controlled Abrasives." By means of a special process, this company is processing shot and grit in such a manner to produce the best degree of toughness and hardness in relation to the size.

It is claimed that with the degrees of hardness and toughness controlled, entirely satisfactory results are obtainable.

Service "Steelwave" Skid Platform

Illustrated herewith is the Service "Steelwave" Skid Platform which has been placed on the market by The Service Caster and Truck Co., 596 N. Brownswood Ave., Albion, Mich. Featuring a principle of "Strength Without Weight," the manufacturer lists as advantages: (1) great lightness and strength due to the use of light gauge metal corrugated two ways—crosswise in the deck and lengthwise at right angles to the deck in the side angles; (2) increased safety to loads and workmen due to rounded corners; (3) great resistance to wear from jamming, loading, and impact under heavy service; (4) no possibility of swelling, shrinking, warping, or buckling from atmospheric conditions; (5) unaffected by standing loads, and (6) elimination of splinters or broken top-boards.

The Steelwave skid is fabricated from light sheet metal, 16 to 12-gauge, according to required capacity. Deck and side angles are die formed and legs are of ⅝ x 1½-in. flat steel. All parts are permanently fused by electric welding. Platform sizes for standard models range from 24 x 42 in. minimum to 36 x 72 in. maximum. Minimum clearance, floor to underside of deck, is 6½ in.; maximum, 12 in. Either two or four-way lift truck entrance types can be furnished. Two standard capacities



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For Extraordinary SERVICE and ECONOMY

ATLANTIC WEKA CORP.
35 Wooster St.
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MANUFACTURERS OF
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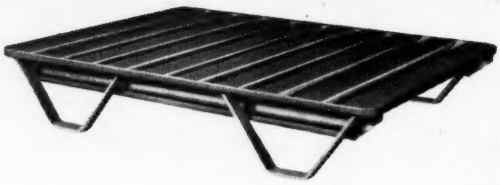
SPECIALTIES



Service "Steelwave" Skid Platform

of 3,500 and 5,000 lb. are available; however, special sizes and capacities can be built to order.

Ideal Roto Sweeper

A general purpose power sweeper known as the "Ideal Roto Sweeper" is now being marketed by the Ideal Power Lawn Mower Company, Lansing, Mich. This sweeping unit is recommended for inside sweeping of large floor areas and also for sweeping docks, platforms, and pavements.

The Ideal Roto Sweeper is said to be capable of sweeping an average of 36,000 sq. ft. per hour. The unit can be used for sweeping concrete, wood, tile, brick, or asphalt. It will pick up both light and heavy sweepings of dirt, dust, sand, gravel, iron fillings, and so on. A sprinkler, incorporated in the unit and regulated to keep the fibre bristles of the brush moist, prevents the raising of any objectionable amount of dust.

The sweeper is equipped with a power-driven rotary brush which is 14 in. in diameter and of special fibre bristles. The brush turns at the proper speed in a counterclockwise direction to pick up the sweepings and carry them up over a rubber deflector into the dirt trap. The sweeper can be equipped with a steel wire brush where the cleaning problem includes hard grease.

The Ideal Roto Sweeper is furnished with straight or angle type brushes. It is possible to use the straight or the angle brush on the same machine, changing from one to another as desired. Where long stretches of straight floor are to be swept, a riding trailer for the operator can be added to the sweeper.

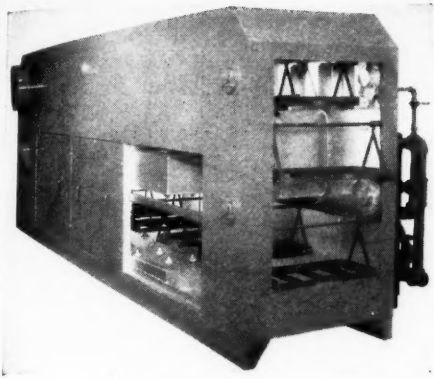
Ideal Roto Sweeper

Want to Improve Your Paint Job?

At no extra cost you can give your customers a better, longer-lived paint job. RUSTICIDE "50" not only cleans but also mildly etches and effectively rust proofs the surface. This inexpensive, non-toxic liquid is easy to handle, removes grease and rust, leaving an ideally toothed surface ready for immediate painting. Write us discussing your operation and we will send complete data. Rusticide Products Co., 3125 Perkins Ave., Cleveland, O. Est. 1920.

Metalwash Return Type Washing Machine

The Metalwash Machinery Co., Inc., 27 Haynes Avenue, Newark, N. J., has perfected a new machine for cleaning metals that will be of deep interest to manufacturers — especially to those engaged in National Defense work. A number of industrial plants are now using this model very successfully for cleaning finished screw machine parts which have



Metalwash Return Type Washing Machine

delicate threads or surfaces that must not be marred or mixed in process of cleaning.

The builders of the machine call it a Return Type Model: only one operator is required for loading and unloading. The saving of time and labor on this point is an important item. Parts to be cleaned can be subjected to any series of washing, rinsing, drying, slushing or rust-proofing operations; and there is never any danger of parts becoming mixed—causing difficulty and delay in assembling. Manufacturers producing ammunition components, fuse parts and shell forgings have found this machine invaluable for rapidity of operation in washing, rinsing and drying.

Special trays are furnished when necessary where provision is made for indexing each piece, and thoroughly cleaning parts that have crevices, hollow sections or blind holes. Either ferrous or non-ferrous parts may be handled simultaneously.

This new Metalwash Model Machine has large capacity, and is heated either by gas, steam, or electric current.

Pangborn Rotoblast Rocker Barrels. Bulletin No. 213 entitled "Pangborn Rotoblast Rocker Barrels" is now being issued by Pangborn Corporation, P. O. Box 380, Hagerstown, Md. Going into greater detail than ever before, this piece of sales and engineering literature describes fully the operation of cleaning miscellaneous items of gray iron, steel, semi-steel malleables, forgings, plate, brass, bronze, alloy, and other castings, heat treated and metal parts, by the Airless Rotoblast method.

Two model sizes recently announced to the trade are included in this book. They are the 3½ cu. ft. capacity Rotoblast Barrel for handling small runs of small parts in an economical manner and also the 17½ cu. ft. content Rotoblast Barrel which will undoubtedly become more or less of a standard size in all modern cleaning departments.

A copy of this bulletin will be sent free upon request.

G-E Instruments and Time Switches are the subject of Bulletin GEA-2753 released by the General Electric Co., Schenectady, N. Y. Among the instruments illustrated and described are hook-on volt-ammeters (a. c.), portable test instruments (a. c. and d. c.), inkless recording instruments, strip-chart and round-chart recording instruments, and time meters.

Time switches covered include general-purpose automatic time switches, automatic process time switches, and automatic repeating time switches. Copy of Bulletin GEA-2753 free upon request.

The M & E Aero-Dehydrator. A four-page folder describing the M & E Aero-Dehydrator is now being issued by M & E Manufacturing Company, 720 S. Meridian St., Indianapolis, Ind. The function of the unit is to dehydrate or remove the moisture from the air under pressure flowing from air compressors and though various air lines. Complete information and specifications of the unit are included. A copy of this folder will be sent free upon request.

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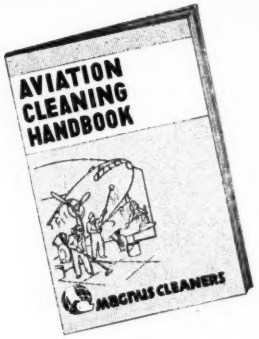
Schauer Speed Lathes. Schauer Machine Co., 2060 Reading Rd., Cincinnati, Ohio, is now issuing a 24-page illustrated circular, designated as the No. 400, which illustrates and describes the Schauer complete line of high production, bench and pedestal speed lathes especially designed for finishing, polishing, burring, or lapping small parts. The line includes standard series units as well as new variable-speed lathes and lathes with vacuum-type holding fixtures. Complete specifications are included in the circular, copy of which can be obtained free upon request.

Aviation Cleaning Handbook. The Magnus Chemical Company, Inc., 10 South Ave., Garwood, N. J., is now issuing a new descriptive, illustrated 24-page booklet for aviation use.

The handbook thoroughly describes cleaning methods and materials for use in the maintenance of aircraft, airports, engine shops, and so on. It is written for all those concerned with safer, more efficient operation and maintenance of aviation equipment.

A few of the cleaning problems discussed in the aircraft section of the handbook are the cleaning of wings,



Magnus Aviation Cleaning Handbook

fuselages, dismantled motors, prevention of sludge in motors and stripping finishes.

In the section devoted to cleaning operations in and around airport buildings and shops such problems as cleaning cement floors and runways, machinery, interiors of buildings, and cleaning and protecting workers' hands are discussed.

The Aviation Cleaning Handbook is attractively bound in aluminum and blue covers and makes a fine addition to one's reference file.

Those wishing a copy of the handbook may obtain it by writing to the Magnus Chemical Company, Inc., 10 South Ave., Garwood, New Jersey.

"Drive Away Those Dark Spots Wherever People Work" is the title of a 16-page illustrated folder now being issued by the McGill Mfg. Co., 1500 N. Lafayette St., Valparaiso, Ind., describing the features, uses, and advantages of McGill Portable Lamp Guards. Copy free upon request.

M & E Hot Lacquer Unit. Literature describing the M & E Hot Lacquer Unit for applying lacquers at elevated temperatures is now being published by M & E Manufacturing Company, 720 S. Meridian St., Indianapolis, Ind. The M &

E Hot Lacquer Unit is designed specifically for applying lacquers at elevated temperatures. The unit is equipped with three heats, one for heavy production, one for medium production, and one for small production. A copy of this literature will be sent free upon request.

CP Compressor Bulletin No. 726. A 30-page, profusely illustrated bulletin containing descriptive information on the construction details, features, uses and operation of CP Classes O-CE (Two-Stage) and O-DE (Single-Stage) Motor-Driven Air and Gas Compressors is now being published by the Chicago Pneumatic Tool Co., 6 E. 44th St., New York, New York.

Copy of Bulletin No. 726 will be sent free of charge to anyone requesting it on his company letterhead.

"The Story of Modern Industrial Weighing" is the title of a broadside which is now being issued by The Exact Weight Scale Co., Columbus, Ohio, illustrating and describing numerous types of Exact Weight Scales for use in checkweighing, counting, balancing, compounding, testing, and handweighing. Photographs showing the application of Exact Weight Scales to various industries are included.

Copy of broadside free upon request.

Lyon Pallet Type Hydraulic Lift Truck. Bulletin No. 117 containing illustrated descriptive information on the Lyon Pallet Type Hydraulic Lift Truck for both double-faced and single-faced pallets has been prepared by the Lyon Iron Works, Greene, N. Y.

Copy free upon request.

Allis-Chalmers "Electrifugal" Pump. Allis-Chalmers Mfg. Co., Milwaukee, Wis., is now issuing Bulletin B-6140 on the company's all-in-one "Electrifugal" Pump which is rated at 1 to 10 h.p. inclusive for heads up to 160 ft. The bulletin profusely illustrates and describes the unit construction, incorporating either a special splash-proof motor, totally-enclosed fan-cooled motor, or explosion-proof motor as may be required. Copy free upon request.

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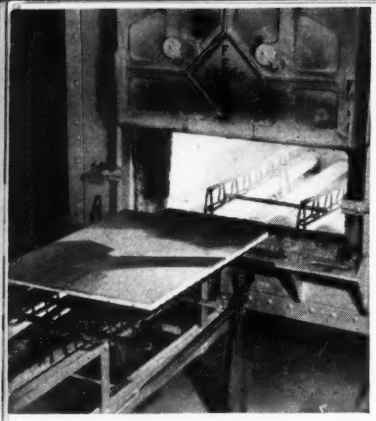

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